Autism Spectrum Conditions and Friendship in a Turkish Speaking Sample

Nadir Kocabaşoğlu

Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements of the degree of

Master of Science
in
Developmental Psychology

Eastern Mediterranean University
July 2015
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

Prof. Dr. Serhan Çiftçioğlu
Acting Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Developmental Psychology.

Assoc. Prof. Dr. Şenel Hüsnü Raman
Chair, Department of Psychology

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Developmental Psychology.

Assoc. Prof. Dr. Mehmet Erginel
Co-Supervisor

Prof. Dr. Biran Mertan
Supervisor

Examining Committee

1. Prof. Dr. Biran Mertan

2. Assoc. Prof. Dr. Şenel Hüsnü Raman

3. Asst. Prof. Dr. İlmiye Seçer

ABSTRACT

Autism spectrum disorder (ASD) is a pervasive neurodevelopmental disorder which includes difficulties in social communication and interaction and also shows restricted, repetitive behaviors. Nowadays, ASD is no longer defined in a sharp distance from normality. This means that every individual with normal intelligence can have some aspects of autistic traits. It is also a fact that individuals with ASD have difficulties in their friendships. The current study aims to find out the differences between educational fields and gender on Autism Spectrum Quotient (AQ) and Cambridge Friendship Questionnaire (FQ). 256 Eastern Mediterranean University students (148 from sciences and 108 from non-sciences completed a demographic information form and two scales (AQ and FQ) to examine the autism spectrum conditions (ASC) and friendship. Results showed that students who were enrolled in a science based program scored higher on AQ than students who were enrolled non-sciences programs. However, there was no gender difference on AQ. Results, further, showed no difference between the types of fields (i.e., sciences vs non-sciences) students were enrolled in and scores obtained on the FQ scale. However, female students scored higher than male students on FQ.

Keywords: Autism Spectrum Disorder, friendship, educational fields, gender.

ÖZ

Otizm spektrum bozukluğu (OSB), sosyal iletişimde ve etkileşimde sorun görülen, sınırlı ve tekrarlayıcı davranışları da içine alan yaygın nörogelişimsel bir bozukluktur. Günümüzde OSB normalden çok da uzak olmayacak şekilde tanımlanmaktadır. Bu demektirki, normal düzeyde zekaya sahip her birey de otistik özellikler taşıyabilir. Kanıta dayalı veriler OSB'si olan bireylerin arkadaşlık ilişkilerinde sorunlar yaşadığını göstermektedir. Bu çalışma, eğitim programları ve cinsiyetler arası farklılıkları Otizm Spektrum Anketi ve Cambridge Arkadaşlık Ölçeği değişkenleri üzerinden incelemeyi hedeflemektedir. Doğu Akdeniz Üniversitesi'nde okuyan 256 (Fen bilimlerinden 148, fen bilimlerden olmayan bölümlerden 108 kişi) öğrenci demografik bilgi formu ve iki farklı ölçeği (Otizm Spektrum Anketi ve Cambridge Arkadaşlık Ölçeği) otizm spectrum durumlarının ve arkadaşlığın araştırılması amacı ile tamamlamışlardır. Fen bilimleri okuyan öğrencilerin Otizm Spektrum Anketi'nde fen bilimleri okumayan öğrencilere kıyasla daha yüksek skorlar aldıkları görülmüştür. Ancak Otizm Spektrum Anketi'nde cinsiyetler arası bir fark bulunamamıştır. Eğitim programlarının Cambridge Arkadaşlık Ölçeği üzerinde herhangi bir farklılığı bulunamamıştır. Ancak, Cambridge Arkadaşlık Ölçeği üzerinde cinsiyetler arası bir fark bulunmuştur.

Anahtar kelimeler: Otizm Spektrum Bozukluğu, arkadaşlık, eğitim programları, cinsiyet.

To My Family

ACKNOWLEDGEMENT

I wish to express my deepest gratitude to my supervisor Prof. Dr. Biran Mertan for providing me an opportunity to work with her, sharing her expertise, and time**.** I am very thankful to her for her patience, valuable advices, for her continuous guidance, and detailed instructions.

I would like to express my appreciation to my co-supervisor Assoc. Prof. Dr. Mehmet Erginel for his advices about all aspects of my thesis, for having faith in me and for all the supports he gave me in all the difficulties I've been through. I also take this opportunity to thank to Assoc. Prof. Dr. Şenel Hüsnü Raman for her valuable advices, comments and supports in this long process. I do not miss the chance to thank Psychology Department of EMU for their valuable contributions on me throughout my undergraduate and graduate years.

I would also like thank to my friend Onur Yılmaz. He was not only there as a good friend but also as a teacher all the time. I would also like express my thanks to my friends Gözde Ağaoğlu, and Caney Göray. They were always there for cheering me up and motivated me.

Finally, I would like to thank to my mother, father and brother. They were always supporting and encouraging me with their best wishes.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS AND SYMBOLS

ABC	Autism Behavior Checklist
ADI-R	Autism Diagnostic Interview-Revised
ADOS	Autism Diagnostic Observation Schedule
ADHD	Attention-deficit Hyperactivity Disorder
ASC	Autism Spectrum Conditions
ASD	Autism Spectrum Disorder
AQ	Autism Spectrum Quotient
CARS	Childhood Autism Rating Scale
CDC	Centers for Disease Control and Prevention
DSM	Diagnostic and Statistical Manual of Mental Disorders
Doi	Digital Object Identifier
DZ	Dizygotic twins
EMB	Extreme Male Brain
E-S	Empathizing-Systemizing
e.g.	Example Given
et al.	And others
etc	et cetera
F	F-ratio
fT	Fetal testosterone
FQ	Cambridge Friendship Questionnaire
EMU	Eastern Mediterranean University
ICD	International Classification of Diseases
i.e.	That Is

KMO	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
M	Mean
MMR	Measles, Mumps and Rubella Vaccines
MZ	Monozygotic twins
n	Sample Number
η^2	Partial Eta Squared
OSB	Otizm Spektrum Bozukluğu
p	Probability
PCA	Principal Component Analysis
PDDs	Pervasive Developmental Disorders
r	Pearson's Correlation Coefficient
R^2	R-square
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
USA	United States of America
Vs	Versus
WCC	Weak Central Coherence
α	Alpha

Chapter 1

INTRODUCTION

Social interaction, in terms of interpersonal relationships, requires intimacy or attraction. Sociability is one of the most important skills which help people to have relations with others and to sustain their lives as human beings. However, one group that is open to misunderstandings in terms of social interaction is individuals with autism spectrum disorder (ASD). According to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), ASD is a neurodevelopmental disorder which includes deficits in reciprocal social interaction and communication, as well as restricted, stereotyped interest and repetitive behaviors (American Psychiatric Association, 2013). Many individuals with ASD do not prefer to have social interaction with others and they are content to live in this way (Freitag, 1970). On the other hand, other studies reported that individuals with ASD may prefer to have closer relations with others as individuals in the population (Pedersen, Livoir-Petersen, & Schele, 1989; Pedersen & Schelde, 1997). The literature regarding sociability of individuals with ASD is, however, inconclusive.

1.1 History

The term `autism` came from the Greek word `autos` meaning self and is first used by a Swiss psychiatrist Bleuler in 1911 as `detachment from the social life` (Dhossche, Shah, & Wing, 2006). Bleuler has used this term to describe the restricted social interaction and monotone behaviors of his patients. An Austrian American child and adolescent psychiatrist Kanner used Bleuler's term `autism` to describe a

group of 11 children's behaviors who showed restricted social interaction and communication with others, preferred loneliness, and showed obsessive behaviors (Kanner, 1943). Later in 1962, Kanner used the term `emotionally disturbed children` for describing these children. While Kanner was studying this disorder, an Austrian pediatrician Hans Asperger was working in the same area but was unaware of Kanner's definition. He believed that he identified a new psychiatric disorder in children that he called `autistic psychopathy` (Gillberg, 1998). Hans Asperger observed a group of children in 1944 and stated that these children have problems in social communication and interaction and isolate themselves from the social world. Asperger also stated that these children are introverted and have different kinds of gestures (Hippler & Klicpera, 2003). Consequently, he realized that what he identified was `basically a different type` of Kanner's "emotionally disturbed children" which he proposed as Asperger's Syndrome (Gillberg, 1998).

Furthermore, the first formal diagnostic criteria for ASD emerged with the publication of DSM-III in 1980 (Matson & Kozlowski, 2011). According to DSM-III, six criteria were needed for diagnosis; two related with social incapability, two related with language, one is about age of onset and one indicating that there should not be positive psychosis symptoms for distinguishing it from psychotic disorders (3rd ed.; DSM–III; American Psychiatric Association, 1980). However, the concept and the diagnostic criteria of ASD changed each time the manual was revised. These revisions include what criteria are categorized as symptoms of ASD, symptom addition, number of symptoms required for a diagnostic and age of onset criterion (Matson & Kozlowski, 2011). Later on, DSM-IV was published in 1994 and `autistic disorder` was placed under the category of pervasive developmental disorders (PDDs). DSM-IV emphasized 3 main diagnostic criteria which were qualitative

deficiency in social interaction, qualitative deficiency in communication and repetitive and restricted interest or behavior (4th ed.; DSM–IV; American Psychiatric Association, 1994).

Currently, the diagnostic criteria of ASD have undergone significant changes with the publication of DSM-5 in May 2013. In DSM-5, ``autism spectrum disorders`` include autistic disorder, Asperger's disorder, and childhood disintegrative disorders which were considered as different disorders in DSM-IV (Wakefield, 2013). DSM-5 demonstrates only two symptom domains which are social communication and fixated, repetitive interests. DSM-5 eliminated other subtypes of ASD and explains individual differences in terms of severity levels depending on social communication and restricted behaviors. These individual differences are related with biological age and developmental levels because some symptoms differ across the individual's lifespan. Emphasizing developmental level and age is an essential issue for understanding the specificity of the ASD related deficits which is better defined in DSM-5 than DSM-IV (Lord & Bishop, 2010).

Although DSM is a widely used tool by different cultures, there are some criticisms about this manual. First of all, DSM is a categorical system and it has been argued that psychopathology is better understood within a dimensional system. Secondly, because of this categorical diagnosis individuals are labeled as having mental disorder until the end of their lives. It is, moreover, clear that labeling leads to stigmatization. Despite these negative consequences, however, it is obvious that there is a need for a diagnosis in order to start a treatment (Andersson & Ghaderi, 2006). This shift from categorical diagnosis to dimensional for some authors is still not

satisfying as they believe that a more accurate term may be `autism spectrum conditions (ASC)` rather than ASD (Baron-Cohen et al., 2009).

1.2 Epidemiology

ASD was seen as a rare disorder thirty years ago. Nowadays, it is recognized by Centers for Disease Control and Prevention (CDC) as a common disorder with the prevalence rate of 11.3 per 1,000 (1 in 88) children (CDC, 2012). Most recently, CDC stated that incidence of ASD is 1 in 70 boys and 1 in 315 girls. ASD prevalence has increase over 600% over the past two decades, which shows that ASD is no longer a rare disorder (Lord & Bishop, 2010). However, it is still unclear whether the increasing rate is due to the extension of the diagnostic criteria of DSM-IV, enlarged consciousness, differences in methodological studies or an actual increase in the incidence of ASD (American Psychiatric Association, 2013).

In this regard, Lord and Bishop (2010) maintain that one of the most important factors concerning the increased prevalence rate of ASD is the changes in diagnostic criteria. Another reason for the increasing rate of ASD is improved awareness and service provision (Lord & Bishop, 2010). Currently, ASD is frequently discussed in the media and this situation makes parents more aware of ASD. This increased awareness may direct parents to have their children assessed earlier whereas they may have not done so in the past (Matson & Kozlowski, 2011).

Commonly, prevalence estimations are made by using different data collection methods such as retrospective accounts, telephone interviews or surveys. Hence, differences in data collection lead to different prevalence estimates. According to

some views, research about prevalence rate cannot be an evidence for increase or decrease because of methodological differences (Matson & Kozlowski, 2011).

Along with these changes in diagnostic criteria of ASD, the etiology of this disorder is still under investigation and there are different suggestions about what causes ASD.

1.3 Etiology

In many ways, ASD is seen as a mysterious disorder, because it includes deficiency in social cognition and language which are essential to what make humans social beings. Until the last decade, knowledge of neuropathological issues concerning ASD was limited (Geschwind, 2011). Nowadays, ASD is considered as a neurodevelopmental disorder with multiple causes. There is a growing body of scientific findings indicating that ASD is caused by different factors such as genetic vulnerability, different kinds of brain anatomy and environmental factors. The heterogeneity among individuals with ASD is another difficult issue for scientists who investigate the etiology of this disorder (Inglese & Elder, 2009).

Factors playing a role in ASD such as genetic disposition, environmental issues and neurology will be briefly discussed in the following section.

1.3.1 Genetic Disposition

Recognition of the role of genetics in ASD is a milestone for understanding the etiology of this disorder. Twin studies, comparing monozygotic twins (MZ) and dizygotic twins (DZ) and family studies support the role of genetics in ASD. Twin studies have shown that the heritability estimate of ASD is 70-80% (Geshwin, 2011). It has also been found that the rate for MZ twins is 60% and for DZ twins is 5%

which further supports the role of genetics in ASD. In addition, the ratio in siblings of individuals with ASD is almost 6% (Rutter, 2005).

Moreover, these twin and family studies support the idea of broad autism phenotype and susceptibility of this disorder in relatives. It has been found that the risk of ASD in first degree relatives is 22 times greater than the general population (Bill & Geschwind, 2009).

In addition to these twin studies, researchers have claimed that multiple genes play a role in the presence of ASD because of the variability that is seen in children along the whole spectrum of autistic disorders (Inglese & Elder, 2009). It is considered that, there are between 3 to 12 susceptible genes which play a role in ASD and have not been recognized yet (Rutter, 2005). Moreover, genetic studies have shown that, a large number of rare, recurring and nonrecurring mutations lead to ASD (Geschwind, 2011).

Nowadays, advancing paternal age is also seen as a risk factor for ASD. Although the advancing age of father is not seen as a single cause, it is believed that, it contributes to the development of ASD (Hultman, Sandin, Levine, Lichtenstein, & Reichenberg, 2011).

Mukaddes (2013) claimed that although research on the genetic origin of ASD has risen rapidly in recent years, it should be noted that neurological factors are more important than the genetic factors while trying to understand the behaviors because the biological roots of behaviors lie on the neurology rather than genetics.

Therefore the neurological aspect of ASD will be discussed in the following section.

1.3.2 Neurology

It has been considered for years that individuals with ASD have an abnormally large amygdala which is a section of the brain that is related with social orienting, imitation, joint attention, empathy and known as having the function of regulating anxiety levels and social behaviors. So, absence of these behaviors/abilities of individuals with ASD is believed to be related with abnormally large amygdala. It is also believed that individuals with ASD suffer from problems in the limbic system, which is related to emotional regulation (Dawson, 1996).

Most recently, it has been found that the amygdala of children with ASD reach adult size before adolescence while the amygdala of children with normal development show gradual development through the adolescence period (Schumann, Hamstra, Goodlin-Jones, Lotspeich, & Kwon, 2004). Findings have shown that the amygdala is approximately 15% larger in children with ASD than the general population. On the other hand, adolescents and adults with ASD have either no difference (Haznedar et al., 2014) or smaller amygdala volume (Aylward et al., 1999; Nacewicz et al., 2006; Pierce, Müller, Ambrose, Allen, & Courchesne, 2001) than the general population. These findings suggest that, the amygdala grows more rapidly in childhood in children with ASD than the normally developed children but this rapid development does not show itself when individuals with ASD reach the adolescence period (Schumann, Bauman, & Amaral, 2011). Several factors contribute to the brain volume such as number and size of neurons, glial cells and number of afferent and efferent fibers. Genetics, hormones, nutrients and environmental factors cause these differences (Schumann et al., 2004). Although the amygdala of individuals with ASD is of the same size as typically developing individuals, starting from the adolescence

period, important aspects of amygdala's neuroanatomical or functional organization are different (Schumann et al., 2004). The cause of enlarged growth in amygdala and its different neuroanatomical and functional organization are not present in the literature and more studies are required in this regard (Schumann et al., 2004).

Furthermore, a view suggests that there is a cortical under-connectivity in the brain of individuals with ASD. According to this view, the width of the connectivity band that enables communication between the frontal lobe and the posterior lobe is lowered in individuals with ASD. This under-connectivity increases the work of the posterior (visual) part of the brain. Hence, it explains the cognitive and behavioral problems of individuals with ASD, and their superior abilities in visual tasks (Just, Keller, Malave, Kana, & Varma, 2012). Because this cortical under-connectivity leads to impairment on complex functions such as social, language and problem solving capacities which need cooperation between different brain areas to be functional (Borup & Kolgaard, 2014).

1.3.3 Environment

Although most contemporary authors agree on the genetic origin of ASD, there is another belief that environmental factors also play a crucial role in ASD. To date, no specific environmental factors have been scientifically proven that cause to ASD. However, several research projects have examined the possible gene-environment interaction of ASD. The most frequently mentioned factors are child and maternal immunization during pregnancy, environmental exposure to toxins, medications, and some particular perinatal incidence such as anoxia, low birth weight or prematurity. Additionally, other prenatal, perinatal and postnatal factors are under examination. No certain relationship between ASD and environmental factors was found (Inglese & Elder, 2009).

The most controversial findings about environmental factors were the relationship between MMR vaccine and ASD. In the past, it was believed by the medical community that there was a link between ASD and measles, mumps and rubella vaccines (MMR). However, scientific evidence has shown that there is no relation between this vaccines and ASD (Farrington, Miller, & Taylor, 2001). More interestingly, it is also found that the incidence rate of ASD has increased in countries that have stopped using these vaccines (Uchiyama, Kurosawa, & Inaba, 2007).

1.4 Diagnostic Criteria and Core Features

With the development of scientific knowledge, causes of ASD are better known today than during the 20th century. However, methods of detecting ASD earlier are still not widely practiced.

ASD shows itself before the age of three. Symptoms of ASD are typically detected during the second year of life (12 to 24 months of age) but in some severe developmental delay cases symptoms could be recognized earlier than 12 months. As in the criteria for ASD, observed behaviors include developmental delays and/or loss of social and language skills. In cases when these skills have been lost, families or the caregivers report a gradual or rapid decline in overall development of the child. This decline is usually seen between 12 and 24 months of age and this is a red flag for detecting ASD (American Psychiatric Association, 2013). Clinicians argued that the core features of ASD could not be sufficiently identified until the age of 6-10 to have a consistent and valid diagnosis (Matson, Nebel-Schwalm, & Matson, 2007).

According to DSM-5, ASD severity levels are assessed based on the intensity of symptoms. For instance, three different severity levels are based on social communication impairments and restricted and repetitive patterns of behaviors. In severity level 1, the individual with ASD has deficits in social communication and in order to be functional they need social support. Also, the individual has difficulty with initiating social interaction with others and shows atypical responses to social overtures. At this level, behavioral inflexibility causes serious problems with functioning in one or more contexts. Due to the troubled capacity of self-organization and self-planning individuals with ASD are not independent. In severity level 2, even with support, there are noticeable deficits in verbal and nonverbal social communication skills which lead to social impairments. Restricted initiation of social interactions and abnormal responses to social overtures are also observed at this level. Inflexibility of behaviors, difficulty with change, repetitive behaviors are obvious and lead to interference with functioning in different contexts. In severity level 3, severe deficit in verbal and nonverbal communication lead to severe damages in social interaction and allows very limited response to social overtures from others. Inflexibility of behaviors, severe difficulty in coping with change and other restricted or repetitive behaviors clearly interfere with functioning in all contexts of life (American Psychiatric Association, 2013).

The following section gives more detailed information about the language and communication impairments and repetitive and restricted patterns of behavior in ASD.

1.4.1 Language and Communication Deficits

The most noticeable feature of ASD is the impairments in social interaction. Individuals with ASD show little or no ability to initiate social interaction (Eigsti,

Marchena, Schuh, & Kelley, 2011). This condition starts in the early stages of development. To illustrate, infants with ASD may hardly make eye-to-eye contact and when they get older many do not prefer to play with other children - they have a tendency to prefer solitary play (Wulff, 1985). Other characteristics of children with ASD include decreased motivation to respond to others' emotions and share to their emotions (Tager-Flusberg, 1996). Hence, children with ASD seem to live in their own world, they do not have an interest in communicating with other children or their caregivers. Moreover, deficiency in language skills impedes their social interaction (Kelley, Paul, Fein, & Naigles, 2006). For instance, individuals with ASD echo what they hear in their surroundings instead of producing words. This type of expression is called echolalia which restricts their communication with others (Frith, 1989).

Moreover, language is used for instrumental purposes rather than social purposes, and conversation is one-sided and shows poor pragmatic abilities in individuals with ASD (Boucher, 2003). Pragmatics which is defined as appropriate use of language in social and communicative contexts is seriously damaged in individuals with ASD (Tager-Flusberg, 1996). To be able to use pragmatics, people need to have socio-cognitive understanding which involves taking into account another person's knowledge and intentions (Boucher, 2003). Children with ASD produce the same words repeatedly and they have problems when they are trying to express what they want or need which makes them frustrated because they are not understood by other people. Additionally, babbling which is prerequisite for verbal language acquisition (Rees, 1972) is lacking or delayed (Inglese & Elder, 2009) in infants with ASD. Parents also state that their children show odd speech such as repeating or echoing others (Tager-Flusberg & Calkins, 1990).

Moreover, not only verbal communication but also nonverbal communication is impaired in individuals with ASD. There are absent, reduced or atypical use of eye-contact, gestures, facial expression and body orientation. In early onset, children with ASD have impairments in joint attention which is a failure to follow someone's pointing or eye gaze (American Psychiatric Association, 2013).

There are several theories about the language and communication impairments in ASD. The theory of mind is the most commonly used theory for understanding the language deficiency in ASD and is explained in more detail in the next section.

1.4.1.1 Theory of Mind

Having a theory of mind is defined as understanding mental states such as beliefs, desire and knowledge which allows individuals to explain and predict others' behaviors, and is necessary for competent communication (Tomasello, 1995, as cited in Miller, 2006). It is known that an important motivation for communication lies in the sharing of intentions, thoughts, and emotions with others (Tager-Flusberg, 1996). Additionally, the development of theory of mind is essential for using symbols, such as words and body language. Hence, a theoretical explanation of the impaired language of individuals with ASD is that their social and emotional disabilities prevent them from developing theory of mind (Boucher, 2003).

Studies with normally developing individuals have shown that, during the first year of life, the development of language and theory of mind are linked in complex ways (Miller, 2006). Infants engage in joint attention and this makes them communicative while interacting with others (Bruinsma et al., 2004; Carpenter et al., 1998, as cited in Miller, 2006). Toddlers begin to use mental states and engage in imaginary play (Youngblade & Dunn, 1995). Young children listen and participate in talks when

people describe behaviors in terms of desires, beliefs and feelings (de Villiers & Pyers, 2002). On the other hand, children with ASD have difficulty in understanding and reasoning about their own and others' mental states. These difficulties in understanding mental states lead to the communication deficits in ASD, especially for pragmatic aspects of language. Research on typically developing children supports the idea that the development of language abilities and theory of mind are interdependent (Hadwin, Baron-Cohen, Howlin, & Hill, 1997).

1.4.1.2 The Mind-Blindness Theory

The mind-blindness theory states that children with ASD are delayed in the development of the theory of mind which leads to mind-blindness. As a result of this delay, they find other people's behavior confusing and unexpected, even scary. With regard to this, the mind-blindness theory makes sense of the social and communication deficiencies of individuals with ASD (Baron-Cohen, 2009). Difficulties in each developmental level as follows:

A typical 14-month-baby shows joint attention which is following another person's gaze, and this indicates that he or she notices what other people interested in (Scaife & Bruner, 1975). In contrast, same age children with ASD show no or decreased frequency in joint attention in toddlerhood (Swettenham et al., 1998). The typical 24-month-baby is interested in pretend plays with other children. By using their mind-reading skills they are able to understand the other person's mind and to pretend for plays (Leslie, 1987). However, same age children with ASD show little pretend plays or their pretend play focus on a rule-based plan (Baron-Cohen, 1987). Additionally, the typical 4-year-old child can pass the false belief test, understanding that other people can have wrong belief about the world (Moore, Pure, & Furrow, 1990; Wimmer & Perner, 1983) while children with ASD are delayed in succeeding at this

test (Baron-Cohen et al., 1985). Also, children with ASD cannot understand when other people lie about something and get shocked if they realize such a deception (Baron-Cohen, 2007). Moreover, the typical 9-year-old children can recognize what can hurt other people's feelings. Likewise, they can interpret other people's feelings or thoughts from their facial expressions. In contrast, children and also adults with ASD have difficulties in understanding and interpreting these feelings (Baron-Cohen, Wheelwright, Spong, Scahill, & Lawson 2001).

1.4.2 Repetitive and Restricted Behaviors and Interests

Among the routine activities of children those with repetitive characteristics are preferred. It is usual for a child to ask to listen to the same story from the same book every night at bed time. So, repetitive activities are common in early childhood but it disappears before the age of 3-4 in normally developing children. Repetitive behaviors are seen in many individuals with mental disorders. To illustrate, repetitive hand and body movements are seen in children and adults with attention deficit disorder, schizophrenia, and obsessive-compulsive disorder. As with many disorders these repetitive behaviors are seen as one of the core feature of ASD. According to DSM-5, restricted and repetitive patterns of behaviors are among the required criteria for diagnosing ASD (American Psychiatric Association, 2013; Richler, Bishop, Kleinke, & Lord, 2007).

Repetitive behaviors include recurring motor movements or stereotypes such as repetitive hand flapping. These types of behaviors are called self-stimulatory activities and include persistent manipulation of the parts of objects such as rolling the wheels of a toy car (American Psychiatric Association, 2013).

Moreover, inflexible routines and rituals are very important for children with ASD. For instance, if a child's father makes an unusual stop in a shop on the way to school, it makes the child angry. In addition, highly restricted, fixated interests in ASD tend to be abnormal in strength or focus. For example, a child may be absorbed by the functioning of a vacuum cleaner or have an intense interest in dates. Also, extreme obsess including taste, smell, texture or appearance of food or excessive food restrictions are common in ASD (American Psychiatric Association, 2013).

In addition to these core features, for some cases other disorders may be present alongside with ASD. The information about co-morbidity is briefly discussed in the next section.

1.4.3 Co-morbidity

Some of the co-morbid disorders in ASD are intellectual disability, epilepsy, and anxiety and mood disorders. Individuals with ASD also suffer from allergic reaction to foods, depression, gastrointestinal problems, obsessive compulsiveness, and attention-deficit hyperactivity disorder (ADHD) (Nash, 2002). Additionally, structural language disorder which is the inability to construct sentences with correct grammar is common in individuals with ASD. Avoidant-restrictive food intake disorder which is extreme or narrow preferences of food is frequently present together with ASD. As it is stated before, co-morbid diagnoses should be specified when the criteria of ASD and other disorders are met (American Psychiatric Association, 2013).

Individuals with ASD of all ages exhibit troubles with emotions and attention, leading to behavioral problems. The precise diagnosis of co-morbid disorders in

individuals with ASD is of major significance. When these co-morbid disorders are diagnosed, more specific treatment is conceivable (Leyfer et al., 2006).

Having discussed the knowledge of diagnostic criteria and core features of ASD, the next section will provide brief information about diagnostic tools.

1.5 Diagnostic Tools

For children with ASD, early diagnosis and early intervention are essential for a better prognosis. This better prognosis includes language improvements, better social interaction and adaptive functioning and a decrease in maladaptive actions (Kleinman et al., 2008).

Generally, clinical interviews are seen as the gold standard for diagnosing children below the age of 5 years. While diagnosing ASD, clinicians also use a number of empirically validated screening tools such as the Autism Diagnostic Interview-Revised (ADI-R), the Autism Diagnostic Observation Schedule (ADOS), the Autism Behavior Checklist (ABC), and the Childhood Autism Rating Scale (CARS) (Kleinman et al., 2008).

ADI-R (Lord, Rutter, & Le Couter, 1994) is an interview-based tool conducted with parents and assesses a child's communication, repetitive behaviors, play, and social progress. ADOS (Lord, Rutter, DiLavore, & Risi, 1999) is used for assessing communication, play, relatedness, social interaction and restricted behaviors of children. ABC (Krug, Arick, & Almond, 1980) defines a number of typical behaviors for ASD and aims to find out the existence of these behaviors in the subject. CARS (Schopler, Reichler, & Renner, 1988) aims to evaluate the existence and the severity of ASD. Socialization, communication, emotional reactions and sensual sensitivities

are measured and the child is assessed in each item based on the interviewer's and parents' observations.

In addition to these instruments for diagnosing individuals with ASD, Baron-Cohen and his colleagues are interested in the autism spectrum traits or conditions in people with normal intelligence. Autism Spectrum Quotient (AQ) was developed by Baron-Cohen, Wheelwright, Skinner, Martin, and Clubley (2001) in order to assess autism spectrum conditions (ASC). In this regard, ASC in people with normal intelligence will be briefly raised in the next section.

1.6 Autism Spectrum Conditions in People with Normal Intelligence

Nowadays, ASD is no longer defined in a sharp distance from normality. It means that every normal intelligent individual can have some kinds of autistic traits. If it is so, what are the benefits of knowing these traits' existence? The answer is that, being aware of ASC may help people with normal intelligence to understand why they have some inadequacies such as social interaction problems (Baron-Cohen, 2010).

According to Baron-Cohen and colleagues (2001), social communication disability in ASD is on a continuum. This continuum view of authors reduces the importance of the categorical diagnosis and the quantitative approach. Authors also claim that existing diagnostic tools are insufficient for understanding whether someone with normal intelligence is on the ASD continuum. Therefore, they suggest to measure ASC in the normal population (Baron-Cohen, 2010).

Studies have for instance found that parents who have children with ASD receive significantly higher scores on AQ than parents who do not have children with ASD (Wheelwright, Auyeung, Allison, & Baron-Cohen, 2010).

The following sections will give brief overview of theories related with ASC.

1.6.1 The Empathizing-Systemizing (E-S) Theory

Empathizing is defined as identifying another person's feelings and thoughts and responding to these with a suitable feeling. On the other hand, systemizing is defined as analyzing and constructing rule-based systems (Baron-Cohen et al., 2011). According to this theory, the low empathizing skills of individuals with ASD explains their social and communication inadequacies and their inabilities to guess emotions, while their higher systemizing skills explained their detailed and pattern-oriented behaviors (Baron-Cohen, 2009). According to this theory there is a clear sex difference in empathizing and systemizing skills (Baron-Cohen, 2009).

Baron-Cohen (2009) defined five different brain types with different empathizing and systematizing levels: Type E (E>S) indicates that individuals have better empathizing skills than systemizing skills, Type S (S>E) states that individuals have better systemizing skills than empathizing skills, Type B (S=E) indicates that individuals' empathizing and systemizing skills are in balance, Extreme Type E (E>>S) demonstrates that individuals have high level of empathizing skills while their systemizing skills are very low and Extreme Type S (S>>E) indicates that individuals have high level of systemizing skills while their empathizing skills are very low.

It is suggested that, females are more likely to have brains of Type E and males are more likely to have brains of Type S. Additionally, individuals with ASD have brain of Extreme Type S. Opposite to the sex differences in the general population; both women and men with ASD have a brain of Extreme Type S (Baron-Cohen, 2009).

E-S theory is related with other theories such as Weak Central Coherence as it is explained in the next section.

1.6.2 Weak Central Coherence (WCC) Theory

According to WCC theory, individuals with ASD pay detailed attention to local information and they always lose the big picture in everyday life (Happe & Frith, 2006). WCC and E-S theories are very similar; both of them indicate that individuals with ASD have an excellent ability to attend to details. However, the difference between these theories is that whereas the WCC theory sees the individuals with ASD as paying attention to details because of negative reasons, E-S theory sees this action as purposeful because it helps to understand a system (Baron-Cohen, 2009). Moreover, WCC theory suggests that individuals with ASD will always lose themselves in details and never achieve the aim of understanding the system as a whole. In contrast, E-S theory suggests that individuals with ASD, in time, can achieve an understanding of the system as a whole (Baron-Cohen, 2009).

The existence of talented mathematicians with Asperger's syndrome, like Richard Borcherds, is evidence that these individuals can understand the system as a whole by using their good systemizing skills (Baron-Cohen, 2009).

Additionally, E-S theory is later extended to Extreme Male Brain Theory which is an important theory for understanding why males develop ASD more than females (Baron-Cohen, 2009).

1.6.3 Extreme Male Brain (EMB) Theory

Originally, Extreme Male Brain (EMB) Theory of ASD was described by Hans Asperger as:

> The autistic personality is an extreme variant of male intelligence. Even within the normal variation, we find typical sex differences in intelligence… In the autistic individual, the male pattern is exaggerated to the extreme. (1944, as cited in Baron-Cohen, 2004, p.149).

In general, as indicated previously ASD is more common in males than females and men score higher than women on AQ. This is an indication that autistic traits are linked with the sex-related biological factors which are hormonal or genetic. According to EMB theory, females are better than males on empathizing and males are better than females on systemizing. Additionally, individuals with ASD perform better in systemizing than empathizing (Baron-Cohen, 2010).

Moreover, evidence has shown that gender differences between systemizing and empathizing skills also affect people's job preferences. ASD has been seen more commonly within the families of physicists, engineers and mathematicians (Baron-Cohen et al., 2001). These kinds of jobs require good systemizing skills than empathizing skills and males are more interested in these domains than females (Baron-Cohen, Wheelwright, Stott, Bolton, & Goodyer, 1997). Additionally, fathers and grandfathers of individuals with ASD are overrepresented in professions such as engineering. Similarly, some individuals with ASD have special skills in mathematical calculations, chess, mechanical knowledge and other rule-based topics and they are known as "autistic savants" (Baron-Cohen, 2002). Likewise, research on different sub-disciplines have shown that science students score higher on AQ than those studying non-sciences or social sciences which may show that scientific abilities are associated with ASC (Baron-Cohen et al., 2001).

However, it should be noted that cultural expectations and gender roles shape people's actions and interests too. For instance, women are generally expected to have social care jobs such as nurses, teachers etc. while men are expected to have agentive jobs (Baron-Cohen, 2004, p.94). Hence, these beliefs influence the social and economic roles of women and men. When a choice is given to men, they generally prefer to work in `dominance-oriented` jobs those based on social hierarchies and management, and women typically prefer to work in `dominance-attenuating` jobs those based on team works with equal roles for everyone (Eagly, 2013; Pratto, 1996; Valian, 1999). So, emphasizing only on the EMB theory may disregard the reality of the gender roles in societies which shape women's and men's job preferences.

The following section will discuss some biological evidence explaining gender differences with respect to ASD.

1.6.4 The Effect of Testosterone Hormone Theory

The sex difference in ASD indicates that males are more susceptible to developing ASC than females. From the biological point of view, there is evidence that higher levels of testosterone hormones are related with ASC. For instance, higher levels of fetal testosterone (fT) are inversely correlated with eye contact of 12-month-old babies, vocabulary capacity of 18-24-month-old babies and social rapport 4-year-old children develop (Ingudomnukul, Baron-Cohen, Wheelwright, & Knickmeyer, 2007).

Animal studies have also found that, early exposure to androgens such as testosterone lead to sex differences in behavior, brain structure, function and cognition (Arnold, & Breedlove, 1985; Phoenix, Goy, Gerall, & Young, 1959).

Similarly, the effect of testosterone is also seen in human behavior and cognition (Auyenung et al., 2006, as cited in Baron-Cohen et al., 2011). It is shown that there is an inverse correlation between fT and social domains, and a positive correlation between fT and non-social domains (Knickmeyer, Baron-Cohen, Raggatt, & Taylor, 2005).

Additionally, parents who have children with ASD show hyper-masculinization in cognitive aspects relevant with the broader autism phenotype. To illustrate, mothers of the individual with ASD show similar results with the control males on the items related with the social abilities on AQ. All in all, both the androgen and EMB theory suggest that women who have ASC show more masculinization on cognitive aspects (i.e., having more systemizing skills) and are more susceptible to the conditions which androgens lead to. Hence, these hormonal explanations suggest that differences in systemizing and empathizing in individuals with ASD have a biological root (Ingudomnukul et al., 2007).

As it can be seen above, gender differences in systemizing and empathizing skills indicate dissimilarities due to environmental and biological issues (Baron-Cohen, 2004).

With the information about ASD and ASC discussed above, the next section will shed light on the aspect of friendship which is troubled in individuals with ASD.

1.6.5 Friendship

Loneliness is accepted as an unwanted emotion that has negative effects on people (Margalit, 2012). Loneliness can result from the lack of affective bonding and lack of desire to have friends. Hence, the feeling of loneliness depends on the peer relations

(Bauminger & Kasari, 2000). On the other hand, friendships have a positive function on children's social development including social adjustment, self-esteem, decreased anxiety, and less loneliness (Berndt, 2002; Mazurek & Kanne, 2010).

The diagnostic criteria of ASD include deficiency in establishing peer rapport, thus it is not surprising to see that individuals with ASD have fewer friendships than their normally developing peers (Mazurek & Kanne, 2010). This deficiency comprises the ability to engage with others and initiation to share feelings and emotions with them (American Psychiatric Association, 2013). In contrast, individuals who have good fellowship are defined as the ones who have contact with other people, have good relationships, and have close and supportive relations with others (Baron-Cohen & Wheelwright, 2003). Similarly, a high-quality friendship is defined with high measures of prosocial behaviors, closeness, and low levels of disagreement, competition and other negative features (Berndt, 2002). Because of the difficulties in the social relations between children with ASD and their peers, many professionals and parents prefer to insert their children into regular schools. The rationale of this inclusion is both to increase the participation of these children in the mainstream and to increase the awareness about children with differences (Kasari, Locke, Gulsrud, & Rotheram, 2011).

Moreover, it is generally stated that there is a difference in social development between typically developing girls and boys in terms of their relationships. Findings show that girls have more emotional sensitivity when a newcomer joined the group, showed less aggression towards other children, and exhibited more sharing of their toys with other children. In contrast, boys exhibit greater interest in social competition, and social status and preferred doing things instead of communication

for its own sake (Caplan, Crawford, Hyde, & Richardson, 1997; Golombok & Fivush, 1994).

Furthermore, most of the studies about friendships are based on observational methods rather than self-reports. For this reason, Baron-Cohen and Wheelwright (2003) developed a test named as Cambridge Friendship Questionnaire (FQ) to assess whether or not the findings of these observational methods are consistent with self-report. The main aim of the FQ is to find whether there is a gender difference in social relations; and whether men and women differ in terms of their emphasis on other people's emotions versus shared interest. Consistently with past research, it is shown that women are more likely to focus on empathizing in friendships, while men tend to focus more on shared activity such as playing soccer (Baron-Cohen, 2004, p.35). It is also found that FQ scores are inversely correlated with AQ which means that there is a negative relation between autistic traits and friendships (Baron-Cohen & Wheelwright, 2003).

The following section will give brief information about the relationship between educational fields and ASC.

1.6.6 Educational Fields

Earlier studies confirmed that there is an association between science/math skills and autistic conditions (Baron-Cohen et al., 1998). Studies conducted on different educational fields including sciences (i.e., physical sciences, biological sciences, mathematics, computer science, engineering, medicine, or natural sciences), humanities (i.e., classics, language, law, architecture, philosophy, English, theology, history, or music) and social sciences (i.e., geography, economics, social and political sciences, archaeology and anthropology, land economy, or management)

showed differences between educational fields in terms of autistic conditions (Baron-Cohen et al., 2001; Hoekstra, Bartels, Cath, & Boomsma, 2008).

It was shown that scientists scored higher than both humanities and social scientists, and no difference was found between humanities and social scientists on AQ (Baron-Cohen et al., 2001). As mentioned, mathematics, physics, and engineering require high systemizing skills (Baron-Cohen, 2002). Also, E-S (Baron-Cohen, 2009) and EMB (Baron-Cohen, 2010) theories of autism support these findings showing that different brain types are associated with autistic conditions. These findings showed that scientists have more autistic conditions than non-scientists (Baron-Cohen et al., 2001).

Along with literature about ASD, the following section will give information about the current study.

1.7 The Current Study

The current study aims to investigate the ASC and the friendship tendency at the higher education level. Some educational fields such as mathematics, engineering and physics require good systemizing skills because if one piece changes in a system of the operation, it may affect the output of the operation completely (Baron-Cohen, 2004, p.72). Hence, people who choose these fields of education should have good abilities in systemizing. Similarly, individuals with ASD are good in systemizing skills, as shown by Baron-Cohen's, (2009) study there is a positive relation between ASC and the systemizing skills. Moreover, ASD has been defined as a disorder regarding empathy, which is very essential for friendships (Baron-Cohen, 2004, p.35). It is also found that, individuals with ASD are not good at friendship and they

score lower on FQ than the individuals without ASD (Baron-Cohen & Wheelwright, 2003).

With the given literature, the proposed study aims to find out the differences between educational fields and gender on AQ and FQ. The correlation between AQ and FQ will also be investigated in relation to educational fields (sciences vs. non-sciences) and gender. Although there were studies about ASC in university students (e.g., Baron-Cohen et al., 2001), and friendship tendency in individuals with ASD and normally developing individuals (e.g., Baron-Cohen & Wheelwright, 2003), there is no research that combines these two issues in a Turkish speaking sample coming from Turkey and North Cyprus.

In accordance with the aims of this proposed study, the following hypotheses will be investigated:

1) Students studying sciences (e.g., engineering, biology) will score higher than students studying non-sciences (e.g., law, media) on AQ.

2) Students studying sciences will score lower than students studying non-sciences on FQ.

3) Male students will obtain higher scores than female students on AQ.

4) Female students will obtain higher scores than male students on FQ.

5) The scores of AQ and FQ will be inversely correlated.

Chapter 2

METHOD

The current study is designed to examine university students in terms of autism spectrum conditions and friendships tendency. The following paragraphs include detailed information about the research sample, data collection materials and procedure of the current study.

2.1 Participants

The participant sample of the current study consisted of 256 of Turkish speaking university students. 148 of these students were from the sciences (i.e., engineering, mathematics, pharmacy and biology) and 108 of these students were from the non-sciences (i.e., law, journalism, public relations, and radio-tv and film studies) departments at Eastern Mediterranean University (EMU). Of these students, 129 were male and 127 were female. Numbers of male and female students in each educational field are shown in Table 1. The mean age of the students was 22.10 (*SD*=2.78) with a range of 18-30 years old. The mean age for female students was 21.38 (*SD*=2.62) and the mean age for male students was 22.81 (*SD*=2.76). Also, 241 of the students were undergraduates, 7 were postgraduates and 8 were doctoral students. Of these students only 8.6% of them have reported a relative with a psychiatric or psychological condition. The mean duration that the students spends in EMU was 3.21 (*SD*=1.79) years. The mean year of non-sciences students spend at EMU was 2.54 (*SD*=1.80) and the mean year of Sciences students spends in EMU was 3.69 (*SD*=1.63).

Table 1: Number of male and female students in each educational filed

	Male	Female	Total
Sciences	75	73	148
Non-sciences	54	54	108
Total	129	127	256

2.2 Materials

In the current study, a questionnaire was administered to the participants for data gathering. The questionnaire consisted of a demographic information form and two scales (see appendix A): Autism Spectrum Quotient (AQ) and Cambridge Friendship Questionnaire (FQ).

2.2.1 Demographic Information Form

The demographic information form was developed in order to gather information such as age, gender, educational field, degree, and whether or not they have a relative with psychiatric condition. The demographic information form includes 5 questions in total.

2.2.2 Autism Spectrum Quotient (AQ)

Autism Spectrum Quotient (AQ) was developed by Baron-Cohen and his colleagues in 2001 in order to identify the degree to which any normal intelligence adult may have "autistic traits" or "the broader autism phenotype". In 2010, Köse, Bora, Erermiş, and Aydın adapted AQ to the Turkish language. However, the psychometric features of the Turkish version of AQ are not consistent with the English and Dutch versions of AQ. Therefore, in the current study, the English version of AQ was translated to Turkish once again in order to see whether the inconsistence is due to

the adaptation problem or cultural bias. After obtaining written permission from Prof. Simon Baron-Cohen, the translation into Turkish was conducted by a research assistant who is fluent in both English and Turkish. Subsequently, a professional translator translated the Turkish version back into English. The AQ consisted of 50 questions, composed of 10 questions each for measuring 5 different areas: social skill, attention switching, attention to detail, communication and imagination. 24 of these questions were reverse questions. Total AQ and domain scores based on 4-point Likert scale scores ranging from *definitely agree (1)* to *definitely disagree (4).* The total Cronbach's alpha value on English sample was .79. The Cronbach's alpha value for social skills was .77, alpha value for attention switching was .67, alpha value for attention to detail was .63, alpha value for communication was .65 and alpha value for imagination was .65.

2.2.3 Factor Analysis of AQ

A principal component analysis (PCA) was conducted on the 50 items of the AQ. Prior to performing PCA, the suitability of the data for factor analyses was assessed. Inspection of the correlation matrix indicated the presence of many coefficients of .30 and above. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy value was .74 and Bartlett's Test of Sphericity reached statistical significance, supporting factorability of the data (p=.00).

PCA indicated that the presence of 18 components with eigenvalues exceeding 1, explaining 13.69 %, 5.99 %, 4.51 %, 3.69 %, 3.56 %, 3.42 %, 3.34 %, 3.13 %, 3.08 %, 2.70 %, 2.61 %, 2.43 %, 2.31 %, 2.22 %, 2.14 %, 2.11 %, 2.08 % and 2.00 % of the variance, respectively. An inspection of scree plot showed a clear break after the fifth component. This was not further supported by Parallel Analysis which showed nine components with eigenvalues exceeding the corresponding criterion values for a

randomly generated data matrix of the same size (50 variables x 256 respondents). When the items of the subscales were checked, it was found that there were very few items that loaded on the original subscales. For example, only 1 item is loaded on the attention to detail subscale. After that, items were forced on 5 subscales and it was shown that there were very few similarities between these loaded items and the original subscales of AQ.

After trying many ways, it was decided to force items only on two subscales which were grouped as social-communication skills and attention. The two-component solution clarified the total of 19.67 % of the variance with component 1 contributing to 13.69 %, and component 2 to 5.99 %. To aid in the interpretation of these 2 components, oblimin rotation was performed. The rotated solution revealed 2 components, with social-communication skills factor items 7, 11, 13, 17, 22, 26, 31, 33, 35, 36, 39, 44, 45, 47, and 48 loading strongly on component 1 and attention factor items 4, 5, 9, 10, 12, 16, 19, and 32 loading strongly on component 2 (see appendix B). After the reliability analysis was performed, item 10 was removed from the scale.

The Cronbach alpha value for total of 24 items of AQ scale was .74. For the social-communication skills subscale the Cronbach alpha value was .81 and for the attention subscale the Cronbach alpha value was .35. The following analysis will be conducted on adapted AQ with 22 items.

2.2.4 Cambridge Friendship Questionnaire (FQ)

Cambridge Friendship Questionnaire (FQ) was developed by Baron-Cohen and Wheelwright in 2003 in order to assess friendship tendency of adults with normal intelligence. The FQ was used only in the English culture. The FQ was translated to

Turkish after receiving written consent from Prof. Simon Baron-Cohen. The translation into Turkish was performed by a research assistant who is fluent in both English and Turkish. Afterward, a professional translator translated the Turkish version back into English. The FQ consisted of 35 questions, on 28 of which it is possible to score such as "If I moved to a new area, I would put more effort into staying in touch with old friends than making new friends". The FQ scale did not have any reverse questions and subscales. Additionally, questions of FQ scale had a numbers of different response choices. For instance, 11 of these questions had 2 choices, 9 of them had 5 choices, 6 of them had 4 choices, 4 of them had 3 choices, 3 of them had 7 choices and one of them had 8 choices. The scoring for items was variable changing from 0 to 5. Having high scores on FQ means good friendship skills. Some of the questions were asked in statement type and some of them were asked in question type. Participants were requested to tick the box next to the statement which most applies them. Also, in some questions participants were asked to rank their preferences. The Cronbach's α value for FQ was .75. In the current study the Cronbach's α value for FQ was .55.

2.3 Procedure

For the current study to take place, ethical approval was taken from the Eastern Mediterranean University Psychology Department's Ethics and Research Committee. After permission was obtained, participants were recruited by using purposive sampling method. Volunteer university students, both male and female, were recruited from sciences (e.g. biology, engineering, pharmacy) and non-sciences (e.g. law, media) departments at Eastern Mediterranean University. Two different academic areas have been chosen to find out the differences in terms of ASC and friendship tendency. In this regard, permission was taken from the deans of faculties

and departmental chairpersons. If a volunteer student agreed to take part in the study, a brief explanation of the study and consent form was given to them to sign it. A questionnaire was administered either during the class period in a group setting to the students, or it is given to them individually in different times and locations. When the participants finished completing the questionnaire, the researcher thanked them, gave a debriefing form, and asked if the participants have any questions. The duration of data collection was 4 months. Subsequently, the researcher entered the answers to the Statistical Package for Social Sciences (SPSS-Version 20) program and analyzed them.

Chapter 3

RESULTS

In accordance with the purposes of the study, the data collected from university students were analyzed in this section. In the following paragraphs, findings obtained by correlation, ANOVA and regression analyses are presented.

3.1 Correlation Analysis

The relationship between autism spectrum conditions (as measured by AQ), social-communication skills, attention and friendship tendency (as measured by the FQ) of people with normal intelligence was investigated by using Pearson product-moment correlation coefficient (see table 2). Preliminary analyses were conducted to ensure there was no violation of the assumptions of normality, linearity and homoscedasticity.

Firstly, there was not a significant correlation between social-communication skills and attention, r= .04, p>0.05. There was a significant correlation between social-communication skills and AQ, r= .92, p=0.00 also, there was a significant correlation between attention and AQ, r= .43, p=0.00. Second, there was a significant correlation between social-communication skills and FQ, r= -.31, p=0.00 although, there was not a significant correlation between attention and FQ, r= .00, p>0.05. Last, there was a significant correlation between AQ and FQ, r= -.28, p=0.00.

Table 2: Correlation coefficients of the variables

	1	2	3	4
1.AQ-Social-communication skills	-			
2. AQ-Attention	.040	-		
3. AQ-Total	.919**	.430**	-	
4. FQ	-.305**	.001	-.275**	-

Note: ** Correlation is significant at the 0.01 level

3.2 ANOVA on AQ

A between subject design was used to examine the effects of educational fields on autism spectrum conditions between males and females in university students. A 2 (gender: male and female) x 2 (educational fields: sciences and non-sciences) ANOVA was used to analyze the data. Results showed that there was a significant main effect of educational fields ($F(1,252)=10.94$, $p=0.00$, $\eta^2=0.04$) on autism spectrum conditions. This means that students who study sciences ($M=45.96$, $SD=8.11$) scored higher compared to students who study non-sciences ($M=42.68$, $SD=7.43$). However, a main effect of gender on autism spectrum conditions was not found ($F(1,252)=0.30$, $p>0.05$). Furthermore, results indicated that there was not a significant interaction between gender and educational fields on autism spectrum conditions ($F(1,252)=0.00$, $p>0.05$).

3.3 ANOVA on FQ

A between subject design was used to examine the effects of educational fields on friendship tendency between males and females in university students. A 2 (gender: male and female) x 2 (educational fields: sciences and non-sciences) ANOVA was used to analyze the data. Results showed that there was a significant main effect of

gender ($F(1,252)=11.21$, $p=0.00$, $\eta^2=0.04$) on friendship tendency. This means that female students ($M=79.20$, $SD=13.07$) received higher scores compared to male students ($M=72.85$, $SD=15.06$). However, a main effect of educational fields on friendship tendency was not significant ($F(1,252)=2.09$, $p>0.05$). Furthermore, there was not a significant interaction between gender and educational fields in terms of friendship tendency ($F(1,252)=1.77$, $p>0.05$).

3.4 Regression Analysis

A two stage hierarchical multiple regression was conducted with FQ as the dependent variable. In the first step, educational field and gender was entered as control measures. Social-communication skills and attention subscales were entered in stage two. Social-communication skills and attention were entered at stage two because AQ and FQ were already significantly related and to enhance this condition by looking at how much of the variance in FQ is explained by the AQ (i.e., social-communication skills and attention). Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity.

The results showed that at stage one, educational fields and gender contributed significantly to the regression model, (F (2,253) = 7.55, p = 0.00) and accounted for 6% of the variation in FQ. On the second step, when social-communication skills and attention were introduced, another 9% was explained and this change in R^2 was significant, (F (2,251) = 13.85, p = 0.00). In the final model, social-communication skills (β = -.31, p = 0.00) and gender (β = .23, p = 0.00) significantly predicted FQ. Together all the variables accounted for 15% of the variance in FQ. Detailed information on regression analysis is shown in Table 3.

Table 3: Hierarchical multiple regression on FQ

Variables		$\mathbf{R^2}$	$\Delta\mathbf{R^2}$	***B***	***SEb***	**B**
Step1		.056	.056			
	Educational Field			2.58	1.78	.09
	Gender			6.33	1.76	.22**
Step2		.150	.094			
	Educational Field			1.80	1.77	.06
	Gender			6.64	1.68	.23****
	Social-communication Skills			- .62	.12	-.31****
	Attention			.13	.28	.03

Note: ****p<0.01

Chapter 4

DISCUSSION

The current study aimed to investigate the differences between educational fields (sciences vs. non-sciences) and gender in terms of ASC and friendship tendency within university students.

To begin with, it was shown that students studying sciences (i.e., engineering, biology, mathematics and pharmacy) scored significantly higher than students studying non-sciences (i.e., law, public relations, radio-tv and film studies and journalism) on AQ. This finding is in accordance with the literature showing that students studying sciences obtained significantly higher scores than students studying humanities and social sciences which were also classified as non-sciences (Baron-Cohen et al., 2001) on AQ, confirming that ASC is related to scientific abilities (Austin, 2005; Baron-Cohen et al., 2001; Baron-Cohen et al., 1998; Hoekstra et al., 2008). Single-case studies of very talented mathematicians, physicians and computer scientists with ASD have shown that having ASC is not an obstacle to be successful in these fields (Baron-Cohen et al., 2001). Some good examples to this could be Richard Borcherds and Temple Grandin. Richard Borcherds has an advantage of high systemizing skills which allows him to analyze and build rule-based systems easily, and as a result, he became a successful mathematician in academy and proved to be an excellent example for those who have ASD. Also, Temple Grandin is a professor of animal science at Colorado State University, diagnosed with ASD. She

has a succesful career in the academy and known as advocating the rights of individuals with ASD and ethical treatment of animals.

Gender differences on FQ were in line with the previous study conducted by Baron-Cohen and Wheelwright in 2003. In the current study, gender was found to be a predictor for friendship tendency and also, female students scored significantly higher than male students on FQ. This finding revealed a similar implication parallel with other observational studies showing gender differences on the measurement of friendship (Davis, 1994 as cited in Baron-Cohen & Wheelwright, 2003; Maccoby, 1999 as cited in Baron-Cohen & Wheelwright, 2003). Therefore, Baron-Cohen et al. (2003) argued that a high FQ score obtained by women showed that they are more willing to have close, empathic and supportive relationships; to give more importance to people; to like interacting with other people for its own sake; and to think friendship as an essential matter. Similar findings from children sample indicated that, girls show more emotional sensitivity to their friends and seek more emotional depth as well as intimacy compared to boys (Knight & Chao, 1989). However, when boys are observed in their natural environment such as family, and school, the case would be different. Because boys prefer to have relationships that involve social ranking and competition which results from the culture they are raised in that places this demand on them (Baumeister & Leary, 1995; Knight & Chao, 1989; Willingham & Cole, 2013). As an effect of these cultural demands, boys having a lower FQ score, compared to girls makes sense. Also, friendships require empathic skills, that is to be able to understand other people's feelings, desires and answering them in accordance with their expectations and needs. It is generally shown that women have more empathic skills than men and this difference is inline

with higher friendships skills and experiences of women (Baron-Cohen, 2004, p.35; Baron-Cohen & Wheelwright, 2003). FQ has been designed to see the "male" and "female" styles of friendship however, individuals might prefer different things in relationships (e.g., supportive relations vs shared activity) and it does not mean that one style is better or worse than the other, they are just different (Baron-Cohen & Wheelwright, 2003).

Original AQ comprises of five subdomains two of them measuring communication and social skills (Baron-Cohen et al., 2001) and these two skills are important for having social network and friendships. One focus of this study was to look at the relationship between adapted AQ and FQ. A negative relation between AQ and FQ was existent. While AQ score increase FQ score decrease. Additionally, the social-communication skills subscale was found to be the most unique predictor for friendship tendency. Therefore, as expected the association between friendship tendency and social communications skills were negative. It makes sense that having a low social communication score means that the tendency to be friendly would be existent at higher levels. Simply, both concepts are interconnected. However, this prediction did not show itself on the condition of the attention subscale. It could be argued that the attention subscale does not explain the behavior in terms of friendship tendency because this particular attention is more about focusing on the detail rather than simply being concentrate on his/her surroundings and for that, it is not very controversial that this attention subscale did not explain the friendship. As mentioned previously, individuals with ASD have difficulties in their reciprocal social interaction and communication skills. According to the severity levels of the ASD, individuals may need social support and care (American Psychiatric Association,

2013). This means that in order to be able to function as an independent individual, as the severity of ASD increases, receiving social support should also be increased. Social and communication skills are essential for friendship. Friendship demands these two skills. Since individuals who showed higher autistic traits manifest little social and communications skills, it is expected of them to show friendship tendency on a lower degree (Baron-Cohen & Wheelwright, 2003). In the current study, this expectation was supported by the high AQ scores and low friendship skills. While having these skills are important in forming good and healthy friendships, the absence of these skills leads to difficulties in social relations. This means that individuals with ASC need support in terms of increasing their friendship skills and this is an important finding in order to detect and solve their relation based problems.

Gender differences in AQ scores were not in line with previous findings (Baron-Cohen et al., 2001). No gender difference were found on AQ. The existing literature suggesting that males have more ASC compared to females (Austin, 2005; Baron-Cohen et al., 2001; Hoekstra, Bartels, Verweij and Boomsa, 2007; Wakabayashi et al., 2006). Findings also showed that males score higher than females on AQ (Baron-Cohen et al., 2001; Hoekstra, Bartels, Verweij and Boomsa, 2007). One explanation to this finding may come from strong cultural factors such as sexism in education or in workplaces, or parents' child-rearing styles or the media which make boys and girls socialize differently (Baron-Cohen, 2004, p.86). While a remarkable gender difference in Turkish (Köse et al., 2010), English (Baron-Cohen & Wheelwright, 2003), and Dutch (Hoekstra et al., 2008) populations are observed in terms of ASC, it was expected to have same gender differences for the current study. One reason for this discrepancy could have resulted from the differences in sample size and

suitability of the scale for the targeted population. A larger sample size that represents the population might provide a stronger result. In addition, the number of males and females were not equal in terms of educational programs (sciences vs non sciences) distribution. For example, very few female students were found in engineering departments and this may affect the results in terms of gender on AQ. However, it should be kept in mind that these different findings between Turkish speaking cultures strongly suggest that more studies are required to see whether or not there is a real gender difference in terms of ASC.

A relationship between AQ and FQ was evident. Since there was a strong association between the two, this relationship was also expected to be found between educational fields and FQ. However, educational fields was not found to be a predictor for friendship tendency and also, there was no difference between educational fields in terms of friendship tendency. A past study conducted by Baron-Cohen and Wheelwright (2003) revealed a strong correlation between AQ and FQ. This particular study created an expectation for FQ to be related with students preference for educational fields. Individuals with higher AQ scores often show difficulties in their social interactions, they show more repetitive behavior, higher systemizing skills and less empathizing skills. Although many individuals with ASC have friendships, these relations are less close, less caring, less empathic and less essential to the individual. Individuals with ASC are less likely to have relations with others for its own sake (Baron-Cohen & Wheelwright, 2003). Since these traits were found to be existent as differences in educational fields, naturally, an expectation towards an association between educational fields and lower FQ scores was deemed to be

meaningful. However, students studying sciences did not score lower on FQ than students studying non-sciences.

One reason for this unexpected finding could be a consequence of a difference between cultural components, specifically collectivism and individualism. In many studies, a difference between collectivism and individualism creates different results. For example individual's tolerance for stress, could be dramatically different in a collectivistic culture compared to those of individualistic cultures (Sawang, Oei, & Goh, 2006). Earlier studies on AQ and FQ were conducted in individualistic cultures such as the Dutch and UK (Hofstede, 1980; Reher, 1998) cultures. However, the current study was conducted on Turkish speaking cultures which are defined as a collectivistic culture (Kagitçibasi, 1996; Kusdil & Kagitçibasi, 2000). Previous studies have shown that characteristics of the sociocultural contexts have an effect on the prevalence rate of ASD. For instance, a cross-cultural study conducted in Italy - characterized as an individualistic culture - and Cuba - characterized as a collectivistic culture - measure the description of people's happiness within a nonclinical sample. It is found that greater happiness comes from money and work for Italians; on the other hand, greater happiness comes from emotional relationship and communication with other people for Cuban participants (Galati, Manzano, & Sotgiu, 2006; Galati et al., 2005; Sotgiu, Galati, Manzano, & Rognoni, 2011). In addition to these results, a noticeable difference was found between the ASD prevalence rates within these two different cultural groups; with the higher prevalence rate for Italians than Cuban population (Sotgiu et al., 2011). One can assume that in the collectivistic Turkish speaking cultures, communication and interaction with other people are very important and fulfilling this demand plays an

important role in the individual's happiness as mentioned above. Even though there is a significant difference on AQ between educational fields, this difference was not there on the variable of FQ. It is believed that a tolerance for ASC is built up over the years by having social interaction and communication. While individuals with higher autistic traits do not prefer sociability on a high scale, in such collectivistic culture they learn to fit in to a significant extent and this fitting may have resulted in FQ scores to be non-discrepant.

Reliability of Turkish version of FQ was at medium strength. However, the PCA results of Turkish AQ were not consistent with the original questionnaire created by Baron-Cohen and his collegues in 2001. Previously, an exploratory factor analysis was conducted in a Turkish students sample indicated three factors in the AQ (Köse et al., 2010). Yet, only two factors with 22 questions could be identified: (a) social skills and communication were placed under one factor named 'social-communication skills'; (b) attention switching and attention to detail were placed under another factor named 'attention'. It is by nature that a difference in component distribution would be deemed almost mandatory and a difference in consistency would not be a surprise. However, three out of five of the components to be non-explanatory were not expected and half of the items being removed from the scale must have definitely lowered the power of the assessment tool. One implication of this finding could be that the items removed explaining previous factors simply did not work on the Turkish speaking sample. This means that either these items must be modified to be better suited to the Turkish speaking cultures, or a completely new scale must be developed for the Turkish speaking samples coming from Turkey and North Cyprus. On the other hand, this inconsistency of current and previous results

could have resulted from translation. This does not indicate an error in translation, but rather that the questions may not be culturally appropriate for Turkish speaking individuals to understand it as it was meant to be understood in Western populations. An excellent example to this could be the item "I find myself drawn more strongly to people than to things." While the word 'things' may make perfect sense in English, when translated to Turkish, makes less sense. What 'being drawn to people' in English may mean in Turkish that being more interested in them which also makes less sense. This example demonstrates the cases known as 'lost in translation' (Peña, 2007). Simply, meanings are lost and the items were removed from the assessment because they did not work in the sample studied.

There were several limitations in the present study. Firstly, the sample size of the current study consisted only of university students. This simply means that generalizability of the findings may not be too strong. In addition, translation was definitely an issue in this research. As discussed above, AQ suffers from issues of lost meanings of the words (Peña, 2007). However, this was not discussed for FQ. Even though the reliability of FQ was deemed enough to conduct a proper analysis, it does not necessarily mean that a questionnaire that was found to be suited for Western culture is also suited for a culture that is more collectivistic and carries more oriental traits.

Possible improvements could be made to the current research. Using more scales would also provide a higher measure for ASC. One example to this could be scales to measure empathizing skills and systemizing skills which would provide a stronger evidence for the hypotheses. A suggestion that could be made for further research

could be an investigation of ASC of parents. If parents have high levels of ASC, would it affect the child in the same way? Trying to answer this question would contribute to the etiology of ASC. A similar question was asked in a twin study conducted by Hoekstra and her collegues (2007), which revealed that children with ASD also had parents high in ASC. Even though this means that there is a genetic component that contributes to ASD, parental effect on a behavioral basis should also be studied because knowing that parents have an effect on children's autistic traits would help us build up knowledge on etiology.

Additionally, previous studies and the current study have found a relation between educational fields and ASC. However, they did not look at whether or not the time spent in these educational fields also increases the ASC. Being a senior student means practicing more in a particular field. A particular field requires an individual to show traits related to the department itself. For example, an individual who studies in engineering may have a type of cognition completely different than those who study in communications. While an engineer may be expected to be a hardworking individual who has a tremendous amount of systemizing skills and high mathematical skills, a graduate of communications department would be expected to be an expert in social interactions and to have a mind trained to analyze social events on a higher scale compared to others. If an individual practices in a particular field, naturally, they would be expected to show these traits more over the years. Therefore, if a longitudinal study through the undergraduate years was to be conducted, it would provide a better understanding on the effect of the matter.

From the AQ results, people can learn if they have autistic traits or not. Knowing these traits gives them a clue about why they have some kinds of personal characteristics. Recognizing their autistic traits can help them to find some ways to reduce and cope with these traits. Especially if these traits of individuals were to be recognized from childhood, some adaptation and reduction strategies could be found to lessen them. To be able to detect these traits earlier, parent studies can be conducted to see whether or not the individual has a predisposition to the autistic traits. It is known that ASD has genetic and neurological causes. However, early prevention strategies can decrease damages of these traits in the individual's life. As mentioned, Turkish speaking cultures need a newly designed AQ. After obtaining an appropriate tool for Turkish speaking cultures, it can be used for for assessing the families' autistic traits to identify children of these families at risk for ASD. Then, a children's version of the AQ can be designed for Turkish speaking cultures for predicting the existence of the autistic traits in childhood as well.

Additionally, to reduce the inadequacies such as extreme social withdrawal in individuals with ASC, AQ can be used as a screening tool by psychological counseling centres for developing different intervention programs. These interventions could mainly focus on informing individuals and their families regarding the ASC and the consequences of these conditions on their lives. After being aware of these conditions, for example if an individual has problems in social interaction and communication with others, some strategies can be found to increase their social and communication skills by psychologists. If psychologists are to know what traits are and through which conditions they manifest as inadequacies in

individuals, then psychologists would know how to intervene and modify that particular behavior in a desired way.

In conclusion, even though there are many studies in gender differences and scientific abilities on ASC (e.g., Baron-Cohen et al., 2001; Köse et al., 2010; Hoekstra et al., 2008), and friendship tendency in individuals with ASD and normally developing individuals (e.g., Baron-Cohen & Wheelwright, 2003), there is no research that combines both AQ and FQ in the Turkish speaking cultures which makes this study unique. Additionally, the current study shed light on the need of a new tool for assessing ASC in Turkish speaking sample. Also, differences between the literature and the current results showed that further studies on ASC and friendship tendency in Turkish speaking cultures are required for more reliable and stronger results.

REFERENCES

American Psychiatric Association. (1980*). Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Andersson, G., & Ghaderi, A. (2006). Overview and analysis of the behaviourist critism of the diagnostic and statistical manual of mental disorders (DSM). *Clinical Psychologist, 10,* 67-77. doi:10.1080/13284200600690461

Arnold, A.P., & Breedlove, S.M. (1985). Organizational and activational effects of sex steroids on brain and behavior: a reanalysis. *Hormones and Behavior, 19,* 469–498. doi: 10.1016/0018-506X(85)90042-X

Austin, E. J. (2005). Personality correlates of the broader autism phenotype as assessed by the Autism Spectrum Quotient (AQ). *Personality and Individual Differences, 38,* 451–460. doi: 10.1016/j.paid.2004.04.022

Aylward, E. H., Minshew, N. J., Goldstein, G., Honeycutt, N. A., Augustine, A. M., Yates, K. O., Barta, P. E., & Pearlson, G. D. (1999). MRI volumes of

amygdala and hippocampus in non–mentally retarded autistic adolescents and adults. *Neurology*, *53*, 2145-2145. doi: 10.1212/WNL.53.9.2145

Baron-Cohen, S. (1987). Autism and symbolic play. *British Journal of Developmental Psychology, 5,* 139–148. doi: 10.1111/j.2044-835X.1987.tb01049.x

Baron-Cohen, S. (2002). The extreme male brain theory of autism. TRENDS in *Cognitive Science, 6,* 248-253. doi:10.1016/S1364-6613(02)01904-6

Baron-Cohen, S. (2004). *The essential difference.* London: Penguin Books.

Baron-Cohen, S. (2007). I cannot tell a lie. *In Character, 3,* 52–59.

Baron-Cohen, S. (2009). Autism: the empathizing-systemizing (E-S) theory. *Annals of the New York Academy of Sciences,* 1156, 68-80. doi:10.1111/j.1749-6632.2009.04467.x

Baron-Cohen, S. (2010). Empathizing, systemizing, and the extreme male brain theory of autism. *Progress in Brain Research, 186,* 167-173. doi:10.1016/B978-0-444-53630-3.00011-7

Baron-Cohen, S., Bolton, P., Wheelwright, S., Short, L., Mead, G., Smith, A., & Scahill, V. (1998). Autism occurs more often in families of physicists, engineers, and mathematicians. *Autism, 2,* 296–301.

Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a 'theory of mind'? *Cognition, 21*, 37–46. doi:10.1016/0010-0277(85)90022-8

Baron-Cohen, S., Lombardo, M. V., Auyeung, B., Ashwin, E., Chakrabarti, B., & Knickmeyer, R. (2011). Why are autism spectrum conditions more prevalent in males? *PLoS Biology, 9,* 1-10. doi:10.1371/journal.pbio.1001081

Baron-Cohen, S., Scott, F. J., Allison, C., Williams, J., Bolton, P., Matthews, F. E., & Brayne, C. (2009). Prevalence of autism-spectrum conditions: UK school-based population study. *The British Journal of Psychiatry,* 500-509. doi:10.1192/bjp.bp.108.059345

Baron-Cohen, S., & Wheelwright, S. (2003). The friendship questionnaire: an investigation of adults with asperger syndrome or high-functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders, 33*, 509-517. doi:10.1023/A:1025879411971

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-spectrum quotient (AQ): evidence from asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders, 31,* 5-17.

Baron-Cohen, S., Wheelwright, S., Stott, C., Bolton, P., & Goodyer, I. (1997). Is there a link between engineering and autism?. *AUTISM-LONDON-, 1,* 101-109.

Baron-Cohen, S., Wheelwright, S., Spong, A., Scahill, V., & Lawson, J. (2001). Are intuitive physics and intuitive psychology independent? *Journal of Developmental and Learning Disorders, 5,* 47–78.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*, 497. doi:10.1037/0033-2909.117.3.497

Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Chid Development, 71,* 447-456. doi:10.1111/1467-8624.00156

Bauminger, N., Solomon, M., & Rogers, S. J. (2010). Predicting friendship quality in autism spectrum disorders. *Journal of Autism and Developmental Disorders, 40,* 751–761.

Berndt, T. J. (2002). Friendship quality and social development. *Current Directions in Psychological Science,* 7-10. doi:10.1111/1467-8721.00157

Bill, B. R., & Geschwind, D. H. (2009). Genetic advances in autism: heterogeneity and convergence on shared pathways. *Current Opinion in Genetics & Development, 19,* 271-278. doi:10.1016/j.gde.2009.04.004

Borup, J. and Kølgaard, C. (2014). Disrupted Cortical Connectivity as an Explanatory Model for Autism Spectrum Disorder. *Journal of European Psychology Students, 5,* 19-24. doi:10.5334/jeps.bn

Boucher, J. (2003). Language development in autism. *International Congress Series,* 247– 253. doi:10.1016/S0531-5131(03)00976-2

Bruinsma, Y., Koegel, R. L., & Koegel, L. K. (2004). Joint attention and children with autism: A review of the literature. *Mental Retardation and Developmental Disabilities, 10,* 169–175. doi: 10.1002/mrdd.20036

Caplan, P., Crawford, M., Hyde, J., & Richardson, J. (1997). *Gender differences in human cognition.* Oxford: Oxford University Press.

Centers for Disease and Control and Prevention. (2012). Prevalence of autism spectrum disorders — autism and developmental disabilities monitoring network, 14 sites, united states, 2008. *MMRW: Surveill Summ, 61,* 1-19.

Dawson, G. (1996). Brief report: neuropsychology of autism: a report on the state of the science. *Journal of Autism and Developmental Disorders, 26,* 179-184. doi:10.1007/BF02172008

de Villiers, J. G., & Pyers, J. E. (2002). Complements to cognition: a longitudinal study of the relationship between complex syntax and false-belief-understanding. *Cognitive Development, 17,* 1037–1060. doi:10.1016/S0885-2014(02)00073-4

Dhossche, D., Shah, A., & Wing, L. (2006). Blue prints for the assessment, treatment and future study of catatonia in autism spectrum disorders. *International Review of Neurobiology, 72,* 267–284.

Eagly, A. H. (2013). *Sex differences in social behavior: A social-role interpretation*. Psychology Press.

Eigsti, I. M., de Marchena, A. B., Schuh, J. M., & Kelley, E. (2011). Language acquisition in autism spectrum disorders: A developmental review. *Research in Autism Spectrum Disorders, 5,* 681-691. doi:10.1016/j.rasd.2010.09.001

Farrington, C. P., Miller, E., & Taylor, B. (2001). MMR and autism: further evidence against a causal association. *Vaccine, 19,* 3632–3635. doi:10.1016/S0264-410X(01)00097-4

Farrugia, D. (2009). Exploring stigma: medical knowledge and the stigmatisation of parents of children diagnosed with autism spectrum disorder. *Sociology of Health & Illness, 31,* 1011–1027. doi:10.1111/j.1467-9566.2009.01174.x

Fodstad, J. C., Matson, J. L., Hess, J., & Neal, D. (2009). Social and communication behaviours in infants and toddlers with autism and pervasive developmental disorder-not otherwise specified. *Developmental Neurorehabilitation, 12,* 152-157. doi:10.1080/17518420902936748

Freitag, G. (1970). An experimental study of the social responsiveness of children with autistic behaviors. *Journal of Experimental Child Psychology, 9,* 436-453. doi:10.1016/0022-0965(70)90030-5

Frith, U. (1989). A new look at language and communication in autism. *International Journal of Language & Communication Disorders, 24,* 123-150. doi:10.3109/13682828909011952

Galati, D., Manzano, M., & Sotgiu, I. (2006). The subjective components of happiness and their attainment: A cross-cultural comparison between Italy and Cuba. *Social Science Information, 45,* 601–630. doi:10.1177/0539018406069594

Galati, D., Schmidt, S., Sini, B., Tinti, C., Manzano, M., Roca, M., & Esta´un Ferrer, S. (2005). Emotional experience in Italy, Spain, and Cuba: A cross-cultural comparison. *Psychologia, 48,* 268–287. doi:10.2117/psysoc.2005.268

Geshwin, D. H. (2011). Genetics of autism spectrum disorders. *Trends in Cognitive Sciences, 9,* 403-416. doi:10.1093/med/9780195371826.003.0053

Gillberg, C. (1998). Asperger syndrome and high-functioning autism. *The British Journal of Psychiatry, 172,* 200-209. doi:10.1192/bjp.172.3.200

Golombok, S., & Fivush, R. (1994). *Gender development.* Cambridge: Cambridge University Press.

Hadwin, S., Baron-Cohen, S., Hawlin, P., & Hill, K. (1997). Does teaching theory of mind have an effect on the ability to develop conversation in children with autism? *Journal of Autism and Developmental Disorders, 27,* 519-537.

Happe, F., & Frith, U. (2006). The weak coherence account: detail-focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders , 36,* 5-25. doi:10.1007/s10803-005-0039-0

Happe, F., Ronald, A., & Plomin, R. (2006). Time to give up on a single explanation for autism. *Nature Neuroscience, 9,* 1218-1220. doi:10.1038/nn1770

Haznedar, M. M., Buchsbaum, M. S., Wei, T. C., Hof, P. R., Cartwright, C., Bienstock, C. A., & Hollander, E. (2014). Limbic circuitry in patients with autism spectrum disorders studied with positron emission tomography and magnetic resonance imaging. *American Journal of Psychiatry*, *157*, 1994-2001. doi:10.1176/appi.ajp.157.12.1994

Hippler, K., & Klicpera, C. (2003). A retrospectiveanalysis of the clinical case records of„autistic psychopaths‟ diagnosed by Hans Asperger and his team at the university of children‟s hospital. *Vienna Philosophical Transactions of the Royal Society of London, 358,* 291–301.

Hoekstra, R. A., Bartels, M., Cath, D. C., & Boomsma, D. I. (2008). Factor structure, reliability and criterion validity of the autism-spectrum quotient (AQ): a study in dutch population and patient groups. *Journal of autism and developmental disorders, 38,* 1555-1566. doi:10.1007/s10803-008-0538-x

Hoekstra, R. A., Bartels, M., Verweij, C. J. H., & Boomsma, D. I. (2007). Heritability of autistic traits in the general population. *Archives of Pediatric and Adolescent Medicine, 161,* 372–377. doi:10.1001/archpedi.161.4.372

Hofstede, G. (1980). *Culture's consequences: international differences in work-related values.* Newbury Park, CA: Sage.

Hultman, C. M., Sandin, S., Levine, S. Z., Lichtenstein, P., & Reichenberg, A. (2011). Advancing paternal age and risk of autism: new evidence from a population-based study and a meta-analysis of epidemiological studies. *Molecular Psychiatry, 16,* 1203–1212. doi:10.1038/mp.2010.121

Hurst, R.M., Mitchell, J.T., Kimbrel, N.A., Kwapil, T.K., & Nelson-Gray, R.O. (2007). Examination of the reliability and factor structure of the Autism Spectrum Quotient (AQ) in a non-clinical sample. *Personality and Individual Differences, 43,* 1938-1949. doi:10.1016/j.paid.2007.06.012

Inglese, M. D., & Elder, J. H. (2009). Caring with autism spectrum disorder, part I: prevelance, etiology, and core features. *Journal of Pediatric Nursing, 24,* 41-48. doi:10.1016/j.pedn.2007.12.006

Ingudomnukul, E., Baron-Cohen, S., Wheelwright, S., & Knickmeyer, R. (2007). Elevated rates of testosterone-related disorders in women with autism. *Hormones and Behavior,* 1-8. doi:10.1016/j.yhbeh.2007.02.001

Just, M. A., Keller, T. A., Malave, V. L., Kana, R. K., & Varma, S. (2012). Autism as a neural systems disorder: A theory of frontal-posterior underconnectivity. *Neuroscience and Biobehavioral Reviews, 36,* 1292–1313. doi:10.1016/j.neubiorev.2012.02.007

Kagitçibasi, C. (1996). The autonomous-relational self: A new synthesis. *European Psychologist, 1,* 180–196

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child, 2,* 217 – 250.

Kanner, L. (1962). Emotionally disturbed children: a historical review. *Child Development, 33,* 97-102.

Kasari, C., Locke, J., Gulsrud, A., & Rotheram-Fuller, E. (2011). Social networks and friendship at school: comparing children and without ASD. *J Autism Dev Disord, 40,* 533-544. doi:10.1007/s10803-009-0928-8

Kelley, E., Paul, J. J., Fein, D., & Naigles, L. R. (2006). Residual language deficits in optimal outcome children with a history of autism. *Journal of Autism and Developmental Disorders, 36,* 807–828. doi:10.1007/s10803-006-0111-4

Kleinmann, J. M., Ventola, P. E., Pandey, J., Verbalis, A. D., Barton, M., Hodgson, S., Green, J., Dumont-Mathieu, T., Robins, D., & Fein, D. (2008). Diagnostic Stability in Very Young Children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 38,* 606-615. doi:10.1007/s10803-007-0427-8

Knickmeyer, R., Baron-Cohen, S., Raggatt, P., & Taylor, K. (2005). Foetal testosterone, social cognition, and restricted interests in children. *Journal of Child Psychology and Psychiatry, 46,* 198–210.

Knight, G. P., & Chao, C. C. (1989). Gender differences in the cooperative, competitive, and individualistic social values of children. *Motivation and Emotion, 13,* 125-141.

Köse, S., Bora, E., Erermiş, S., & Aydın, C. (2010). Otizm-spektrum anketi türkçe formunun psikometrik özellikleri. *Anadolu Psikiyatri Dergisi, 11,* 253-260.

Krug, D. A., Arick, J., & Almond, P. J. (1980). Behavior checklist identifying severely handicapped individuals with high levels of autistic behavior. *Joumal of Child Psychology and Psychiatry, 21,* 221-229.

Kurita, H., Koyama , T., & Osada, A. H. (2005). Autism-Spectrum Quotient–Japanese version and its short forms for screening normally intelligent persons with pervasive developmental disorders. *Psychiatry and Clinical Neurosciences, 59,* 490-496.

Kusdil, M. E., & Kagitçibasi, C. (2000). Value orientations of Turkish teachers and Schwartz' theory of values. *Turk Psikoloji Dergisi, 15,* 59–80.

Leslie, A. M. (1987). Pretence and representation: the origins of "theory of mind." *Psychological Review, 94,* 412– 426.

Leyfer, O. T., Folstein, S. E., Bacalman, S., Davis, N. O., Dinh, E., Morgan, J., Tager-Flusberg, H., & Lainhart, J. E. (2006). Comorbid psychiatric disorders in children with autism: interview development and rates of disorders.

Journal of Autism and Developmental Disorders, 36, 849–861. doi:10.1007/s10803-006-0123-0

Lord, C., & Bishop, S. L. (2010). Autism spectrum disorders diagnosis, prevalence, and services for children and families. *Social Policy Report, 24,* 1-21.

Lord, C., Rutter, M., DiLavore, P., & Risi, S. (1999). *Autism diagnostic observation schedule-WPS edition*. Los Angles, CA: Western Psychological Services.

Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism diagnostic interview-revised: A revised version of a diagnostic interview forcaregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders, 24,* 659–685.

Margalit, M. (2012). *Loneliness among children with special needs: Theory, research, coping, and intervention*. Springer Science & Business Media.

Matson, J. L., & Kozlowski, A. M. (2011). The increasing prevalence of autism spectrum disorders. *Research in Autism Spectrum Disorders, 5,* 418-425. doi:10.1016/j.rasd.2010.06.004

Matson, J. L., Nebel-Schwalm, M., & Matson, M. L. (2007). A review of methodological issues in the differential diagnosis of autism spectrum disorders in children. *Research in Autism Spectrum Disorders, 1,* 38–54. doi:10.1016/j.rasd.2006.07.004

Mazurek, M. O., & Kanne, S. M. (2010). Friendship and internalizing symptoms among children and adolescents with ASD. *Journal of Autism and Developmental Disorders, 40,* 1512–1520. doi:10.1007/s10803-010-1014-y

Miller, C. A. (2006). Developmental relationships between language and theory of mind. *American Journal of Speech-Language Pathology, 15,* 142–154. doi:10.1044/1058-0360(2006/014)

Moore, C., Pure, K., & Furrow, D. (1990). Children's understanding of the modal expression of speaker certainty and uncertainty and its relation to the development of a representational theory of mind. *Child Development, 61,* 722–730.

Mukaddes, N. M. (2013). *Otizm spektrum bozuklukları tanı ve takip.* İstanbul: Nobel Tıp Kitapevleri.

Nacewicz, B. M., Dalton, K. M., Johnstone, T., Long, M. T., McAuliff, E. M., Oakes, T. R., Alexander, A., & Davidson, R. J. (2006). Amygdala volume and nonverbal social impairment in adolescent and adult males with autism. *Archives of General Psychiatry*, *63,* 1417-1428. doi:10.1001/archpsyc.63.12.1417

Nash, M. (2002). The number of children diagnosed with autism and Asperger's in the U.S. is exploding. Why? *The Secrets of Autism,* 1-8.

Pedersen, J., Livoir-Petersen, M., & Schelde, J. (1989). An ethological approach to autism: An analysis of visual behaviour and interpersonal contact in a child versus adult interaction. *Acta Psychiatrica Scandinavica, 80,* 346-355. doi:10.1111/j.1600-0447.1989.tb02991.x

Pedersen, J., & Schelde, T. (1997). Behavioral aspects of infantile autism: An ethological description. *European Child & Adolescent Psychiatry, 6,* 96-106. doi:10.1007/ BF00566672

Peña, E. D. (2007). Lost in translation: methodological considerations in cross-cultural research. *Child development, 78*, 1255-1264.

Phoenix, C.H., Goy, R.W., Gerall A.A., & Young, W.C. (1959). Organizing action of prenatally administered testosterone propionate on the tissues mediating mating behavior in the female guinea pig. *Endocrinology, 65,* 369–382. doi:10.1016/j.yhbeh.2009.01.004

Pierce, K., Haist, F., Sedaghat, F., & Courchesne, E. (2004). The brain response to personally familiar faces in autism: findings of fusiform activity and beyond. *Brain*, *127*, 2703-2716. doi:10.1093/brain/awh289

Pratto, F. (1996). Sexual politics: The gender gap in the bedroom, the cupboard, and the cabinet. *Sex, Power, Conflict: Evolutionary and Feminist Perspectives*, 179-230.

Rees, N. S. (1972). The role of babbling in the child's acquisition of language. *International Journal of Language and Communication Disorders, 7,* 17-23. doi:10.3109/13682827209011549

Reher, D. S. (1998). Family ties in Western Europe: persistent contrasts. *Population and development review,* 203-234.

Rellini, E., Tortolani, D., Trillo, S., Carbone, S., & Montecchi, F. (2004). Childhood Autism Rating Scale (CARS) and Autism Behavior Checklist (ABC) Correspondence and Conflicts with DSM-IV Criteria in Diagnosis of Autism. *Journal of Autism and Developmental Disorders, 34,* 703-708. doi:10.1007/s10803-004-5290-2

Richler, J., Bishop, S. L., Kleinke, J. R., & Lord, C. (2007). Restricted and repetitive behaviors in young children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 37,* 73–85. doi:10.1007/s10803-006-0332-6.

Ronald, A., Happe, F., & Plomin, R. (2005). The genetic relationship between individual differences in social and nonsocial behaviours characteristic of autism. *Developmental Scence, 8,* 444–458. doi:10.1111/j.1467-7687.2005.00433.x

Rutter, M. (2005). Aetiology of autism: findings and questions. *Journal of Intellectual Disability Research, 49,* 231-238. doi:10.1111/j.1365-2788.2005.00676.x

Sawang, S., Oei, T. P., & Goh, Y. W. (2006). Are country and culture values interchangeable? A case example using occupational stress and coping. *International Journal of Cross Cultural Management*, *6*, 205-219. doi:10.1177/1470595806066330

Scaife, M., & Bruner, J. (1975). The capacity for joint visual attention in the infant. *Nature, 253,* 265–266. doi:10.1038/253265a0

Schopler, E., Reichler, R., & Renner, B. (1988). *The childhood autism rating scale.* Los Angeles: Western Psychological Services.

Schumann, C., Bauman, M., & Amaral, D. (2011). Abnormal structure or function of the amygdala is a common. *Neuropsychologia, 49,* 745–759. doi:10.1016/j.neuropsychologia.2010.09.028

Schumann, C. M., Hamstra, J., Goodlin-Jones, B. L., Lotspeich, L. J., & Kwon, H. (2004). The amygdala is enlarged in children but not adolescents with autism; the hippocampus is enlarged at all ages. *The Journal of Neuroscience, 24,* 6392– 6401. doi:10.1523/JNEUROSCI.1297-04.2004

Sotgiu, I., Galati, D., Manzano, M., Gandione, M., Gomez, K., Romero, Y., & Rigardetto, R. (2011). Parental attitudes, attachment styles, social networks, and psychological processes in autism spectrum disorders: a cross-cultural perspective. *The Journal of Genetic Psychology, 172,* 353–375.

Sotgiu, I., Galati, D., Manzano, M., & Rognoni, E. (2011). Happiness components and their attainment in old age: A cross-cultural comparison between Italy and Cuba. *Journal of Happiness Studies, 12,* 353–371. doi:10.1080/00221325.2010.544342

Swettenham, J., Baron-Cohen, S., Charman, T., Cox, A., Baird, G., Drew, A., Rees, L., & Wheelwright, S. (1998). The frequency and distribution of spontaneous attention shifts between social and nonsocial stimuli in autistic, typically developing, and non-autistic developmentally delayed infants. *Journal of Child Psychology and Psychiatry, 9,* 747–753.

Tager-Flusberg, H. (1996). Brief report: current theory and research on language and communication in autism. *Journal of Autism and Developmental Disorders, 26,* 169-172. doi:10.1007/BF02172006

Tager-Flusberg, H. (2006). Defining language phenotypes in autism. *Clinical Neuroscience Research, 6,* 219-224. doi:10.1016/j.cnr.2006.06.007

Tager-Flusberg, H., & Calkins, S. (1990). Does imitation facilitate acquisition of grammar? Evidence from the study of autistic, Down's syndrome and normal children. *Journal of Child Language, 17,* 591–606.

Uchiyama, T., Kurosawa, M., & Inaba, Y. (2007). MMR-Vaccine and Regression in Autism Spectrum Disorders: Negative Results Presented from Japan. *Journal of Autism and Developmental Disorders, 37,* 210–217. doi:10.1007/s10803-006-0157-3

Valian, V. (1999). *Why so slow?: the advancement of women*. MIT press.

Wakabayashi, A., Baron-Cohen, S., Wheelwright, S., & Tojo, Y. (2006). The Autism-Spectrum Quotient (AQ) in Japan: a cross-cultural comparison. *Journal of Autism and Developmental Disorders*, 36, 263–270. doi:10.1007/s10803-005-0061-2

Wakefield, J. C. (2013). DSM-5: an overview of changes and controversies. *Clinical Social Work Journal, 41,* 139-154. doi:10.1007/s10615-013-0445-2

Wheelwright , S., Auyeung, B., Allison, C., & Baron-Cohen , S. (2010). Defining the broader, medium and narrow autism phenotype among parents using the autism spectrum quotient (AQ). *Molecular Autism,* 1-10. doi:10.1186/2040-2392-1-10

Willingham, W. W., & Cole, N. S. (2013). *Gender and fair assessment*. Routledge.

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition, 13,* 103–128. doi:10.1016/0010-0277(83)90004-5

World Health Organization (WHO). (1992). *International statistical classification of disease and related health problems, 10th revision.* Geneva: World Health Organization.

Wulff, S. B. (1985). The symbolic and object play of children with autism: a review. *Journal of autism and developmental disorders*, *15*, 139-148. doi:10.1007/BF01531600

Youngblade, L. M., & Dunn, J. (1995). Individual differences in young children's pretend play with mothers and siblings: Links to relationships and understanding of other people's feelings and beliefs. *Child Development, 66,* 1472–1492.

APPENDICES

Appendix A: The Questionnaire

Türkçe konuşan örneklem grubunda Otizm Spektrum Durumları ve Arkadaşlık İlişkisi araştırılmaktadır. Katılımınız tamamen gönüllülük esasına bağlıdır. Elde edilecek veriler toplu olarak değerlendirilecek ve gizli tutularak sadece bu araştırma kapsamında kullanılacaktır. Soruları samimiyetle ve eksiksiz olarak cevaplamanız, araştırma sonuçlarının geçerliliği açısından son derece önemlidir. Katılımınız için teşekkür ederiz.

Nadir Kocabaşoğlu
Araştırma Görevlisi
Gelişim Psikolojisi Yüksek Lisans Öğrencisi

1. Yaşınız: _____
2. Cinsiyetiniz: Erkek ☐ Kadın ☐
3. Üniversite'de okuduğunuz bölüm: _____Kaçıncı yılınız:_____
4. Üniversite'de okuduğunuz düzey: Lisans ☐ Yüksek Lisans ☐ Doktora ☐
5. Ailenizde herhangi bir psikolojik/psikiyatrik rahatsızlığı olan kişi/kişiler var mıdır? Hayır ☐ Evet ☐
   Evet ise yakınlık derecesi nedir? Lütfen belirtiniz:___

Otizm Spektrum Anketi
Autism Spectrum Quotient (AQ) - Adult

Aşağıdaki her ifadeyi dikkatlice okuyunuz. Her ifadenin sizin için uygunluk derecesini eğer çok uygun ise Kesinlikle Katılıyorum (1) eğer hiç katılmıyorsanız Kesinlikle Katılmıyorum (4) arasındaki 1'den 4'e kadar olan dereceleme ölçeğinde değerlendiriniz.

1. Kesinlikle Katılıyorun
2. Kısmen Katılıyorum
3. Kısmen Katılmıyorum
4. Kesinlikle Katılmıyorum

	1	2	3	4
1. Bir şeyi yalnız başına yapmaktansa başkalarıyla beraber yapmayı tercih ederim.				
2. Bir şeyi sürekli aynı şekilde yapmayı tercih ederim.				
3. Bir şeyi hayal etmeye çalışırsam, resmi zihnimde canlandırmam kolay olur.				
4. Kendimi sıklıkla bir şeye öyle güçlü kaptırırım ki gözüm başka şeyleri görmez olur.				
5. Sıklıkla başkalarının fark etmediği hafif sesleri fark ederim.				
6. Araba plakası ya da ona benzer bilgi dizilerini genellikle fark ederim.				
7. Ben söylediğim şeylerin nezaket kurallarına uygun olduğunu düşünsem de başkaları sıklıkla uygun olmadığını söylüyorlar.				
8. Bir hikaye okurken, hikayedeki karakterlerin neye benzediklerini kolaylıkla hayal edebilirim.				
9. Tarihleri büyüleyici bulurum.				
10. Bir grubun içindeyken, farklı birçok insanın konuşmalarını kolaylıkla takip edebilirim.				
11. Sosyal ortamlarda rahat ederim.				
12. Başkalarının fark etmedikleri ayrıntıları fark etme eğilimim vardır.				
13. Bir partiye gitmek yerine bir kütüphaneye gitmeyi tercih ederim.				
14. Hikayeler uydurmak bana kolay gelir.				
15. Eşyalardan çok insanlar ilgimi çeker.				
16. Sürdüremezsem üzüldüğüm çok güçlü ilgilere sahibimdir.				
17. Sosyal ortamlarda sohbet etmekten keyif alırım.				
18. Ben konuşurken, diğerlerinin araya (söze) girmesi her zaman kolay olmaz.				
19. Sayılar beni büyüler.				

20. Bir hikaye okurken, hikayedeki karakterlerin niyetlerini anlamakta zorlanırım.				
21. Kurgu eserler okumaktan pek zevk almam.				
22. Yeni arkadaşlar edinmekte zorlanırım.				
23. Nesnelerdeki desenleri her zaman fark ederim.				
24. Müzeye gitmek yerine tiyatroya gitmeyi tercih ederim.				
25. Günlük düzenimin bozulması beni rahatsız etmez.				
26. Sıklıkla bir konuşmayı nasıl sürdüreceğimi bilmediğimi farkederim.				
27. Biri benimle konuşurken kolayca "satır aralarını"okurum.				
28. Genellikle küçük ayrıntılardandan çok resmin tümüne odaklanırım.				
29. Telefon numaralarını hatırlama konusunda çok iyi değilimdir.				
30. Genellikle bir durumdaki ya da bir kişinin görünüşündeki küçük değişiklikleri fark etmem.				
31. Birinin beni dinlerken sıkılıp sıkılmadığını anlayabilirim.				
32. Birden çok işi aynı anda kolayca yapabilirim.				
33. Telefonda konuşurken konuşma sırasının bana geldiğinden emin olamıyorum.				
34. Spontan (planlanmadan yapılan) şeyler yapmaktan keyif alırım.				
35. Bir şakadaki espriyi anlayan son kişi genellikle ben olurum.				
36. Yalnızca yüzüne bakarak bir kişinin ne düşündüğünü ya da hissettiğini çözmek benim için kolaydır.				
37. Bir şey araya girse de yapmakta olduğum işe hızla geri dönebilirim.				
38. Sosyal ortamlarda çene çalmak konusunda iyiyimdir.				
39. İnsanlar sıklıkla aynı şeyi tekrar tekrar konuştuğumu söyler.				
40. Çocukken diğer çocuklarla birlikte taklit oyunları oynamaktan zevk alırdım.				
41. Araba, kuş, tren, bitki vs. türler gibi kategorileriyle ilgili bilgi toplamaktan hoşlanırım.				
42. Başka birinin yerinde olmanın nasıl bir şey olabileceğini hayal etmekte zorlanırım.				
43. Katıldığım her etkinliği dikkatlice planlamayı severim.				
44. Sosyal etkinliklerden (misafirlik, parti vs.) keyif alırım.				
45. İnsanların niyetlerini anlamakta zorlanırım.				
46. Yeni durumlar beni kaygılandırır.				

47. Yeni insanlarla tanışmaktan keyif alırım.				
48. İyi bir diplomatımdır (içinde bulunduğum zor durumlarda diğer insanlarla çatısmadan kaçınmakta iyiyimdir).				
49. İnsanların doğum tarihlerini hatırlamak konusunda çok iyi değilimdir.				
50. Çocuklarla taklit oyunları oynamakta zorlanmam.				

Cambridge Arkadaşlık Ölçeği
(Cambridge Friendship Questionnaire)

Lütfen her bir soru için cümlenin yanındaki size en uygun olan kutucuğu işaretleyiniz.

1.	a. Belirli bir ya da iki en iyi arkadaşım var. b. En iyi arkadaşlarım diyebileceğim birkaç kişi var. c. En iyi arkadaşım diyebileceğim kimsem yok.	☐ ☐ ☐
2.	a. Arkadaşlıkla ilgili en önemli şey sır paylaşabilecek birisinin olmasıdır. b. Arkadaşlıkla ilgili en önemli şey birlikte eğlenebileceğin birisinin olmasıdır.	☐ ☐
3.	a. Eğer bir arkadaş seçmem gerekseydi, hayatla ilgili benimle aynı şeyleri hisseden birisi yerine benimle aynı şeyleri yapmaktan keyif alan birisini seçerdim. b. Eğer bir arkadaş seçmem gerekseydi, benimle aynı şeyleri yapmaktan keyif alan birisi yerine hayatla ilgili benimle aynı şeyleri hisseden birisini seçerdim.	☐ ☐
4.	a. İnsanlara yakın olmayı severim. b. İnsanlarla mesafemi korumak isterim.	☐ ☐
5.	a. Arkadaşlarla telefonda konuştuğumda bu genelde muhabbet etmek yerine plan yapmak için oluyor. b. Arkadaşlarla telefonda konuştuğumda bu genelde plan yapmak yerine muhabbet etmek için oluyor.	☐ ☐
6.	a. İlk önce yapmak istediğim bir aktiviteyi düşünüp ondan sonra onu birlikte yapacağım insanları aramaya eğilimliyim. b. İlk önce buluşacak birisini bulup ondan sonra yapacak birşeyler düşünmeye eğilimliyim.	☐ ☐
7.	a. Bir arkadaş ile belirli bir aktiviteyi yapmayı tercih ederim (ör. sinemaya gitmek, golf oynamak). b. Bir arkadaş ile muhabbet etmek için buluşmayı tercih ederim (ör. barda, kafede).	☐ ☐
8.	a. Eğer yeni bir yere gidersem, yeni arkadaşlar edinmektense eski arkadaşlarımla irtibatta kalmayı tercih ederdim. b. Eğer yeni bir yere gidersem, eski arkadaşlarımla irtibatta kalmak yerine yeni arkadaşlar edinmeyi tercih ederdim.	☐ ☐
9.	a. Arkadaşlarım bana birlikte eğlenecek birisi olmamdan çok onlara destek olacak birisi olmama değer verirler. b. Arkadaşlarım bana onlara destek olacak birisi olmamdan çok birlikte eğlenecek birisi olmama değer verirler.	☐ ☐
10	a. Eğer bir arkadaşımın bir sıkıntısı olsaydı, pratik çözümler üretmekten çok sıkıntısıyla ilgili duygularını tartışmakta iyi olurdum. b. Eğer bir arkadaşımın bir sıkıntısı olsaydı, sıkıntısıyla ilgili duygularını konuşmaktan çok pratik çözümler üretmekte iyi olurdum.	☐ ☐
11	a. Eğer bir arkadaşımın kişisel bir sıkıntısı olsaydı, müdahale etmek istemeyeceğimden ötürü onların benimle konuşmasını beklerdim. b. Eğer bir arkadaşımın kişisel bir sıkıntısı olsaydı, sıkıntıyla ilgili tartışmak için onlarla konuşurdum.	☐ ☐

12	a. Kişisel bir sıkıntım olduğunda, bunu kendi başıma çözmeyi daha iyi bulurum. ☐ b. Kişisel bir sıkıntım olduğunda, bunu bir arkadaşla paylaşmayı daha iyi bulurum. ☐ c. Kişisel bir sıkıntım olduğunda, bunu unutmaya çalışmayı daha iyi bulurum. ☐
13	a. Bir arkadaşıma eleştirel bir şey söylemem gerekirse, konuyu hassas bir şekilde açmanın en iyisi olacağını düşünüyorum. ☐ b. Bir arkadaşıma eleştirel bir şey söylemem gerekirse, konuya doğrudan girip söylemenin en iyisi olduğunu düşünüyorum ☐
14	Eğer iyi bir arkadaşımla kavga etmiş olsaydım ve yanlış hiçbir şey yapmadığımı düşünüyor olsaydım a . İlişkiyi düzeltmek için ne gerekiyorsa yapardım. ☐ b. Karşılığı olduğu sürece ilk adımı atmaya istekli olurdum. ☐ c. İlk adımı onlar atsaydı sıkıntıyı çözmeye istekli olurdum. ☐ d. Artık onlarla yakın arkadaş olmaya devam edemezdim. ☐
15	İdeal çalışma alanım a. Kendi başıma, gün içinde kimsenin gelmediği bir ofistir. ☐ b. Kendi başıma, gün içinde arada sırada gelenlerin olduğu bir ofistir. ☐ c. Bir ya da iki kişinin olduğu bir ofistir. ☐ d. Duvarları ayrılmamış, açık bir ofistir. ☐

16	Hislerinizi arkadaşlarınızla tartışmayı ne kolaylıkta yaparsınız? Çok kolay ☐ Oldukça kolay ☐ Çok kolay değil ☐ Oldukça zor ☐ Çok zor ☐
17	Hislerinizi bir yabancıyla konuşmayı ne derece kolay bulurdunuz? Çok kolay ☐ Oldukça kolay ☐ Çok kolay değil ☐ Oldukça zor ☐ Çok zor ☐
18	<u>Kişilik</u> açısından arkadaşlarınıza ne kadar benziyorsunuz? Çok benzerim ☐ Oldukça benzer ☐ Çok benzemem ☐ Hiç benzemem ☐
19	<u>İlgi alanları</u> açısından arkadaşlarınıza ne kadar benziyorsunuz? Çok benzerim ☐ Oldukça benzer ☐ Çok benzemem ☐ Hiç benzemem ☐
20	Arkadaşlarınızın sizinle ilgili ne düşündüğü ne derece önemlidir? Hiç önemli değildir ☐ Çok az önemlidir ☐ Oldukça önemlidir ☐ Çok önemlidir ☐ En üst seviyede önemlidir ☐

21	Yabancıların sizinle ilgili ne düşündüğü ne kadar önemlidir? Hiç önemli değildir ☐ Çok az önemlidir ☐ Oldukça ☐ önemlidir Çok önemlidir ☐ En üst seviyede önemlidir ☐
22	Bir hatanız olduğunda bunu arkadaşlarınıza itiraf etmeyi ne derecede kolay bulursunuz? Çok kolay ☐ Oldukça kolay ☐ Çok kolay değil ☐ Oldukça zor ☐ Çok zor ☐

23	Zayıflıklarınızı ve başarısızlıklarınızı arkadaşlarınıza ne kolaylıkta söylersiniz? Çok kolay ☐ Oldukça kolay ☐ Çok kolay değil ☐ Oldukça zor ☐ Çok zor ☐
24	Başarı ve kazançlarınızı arkadaşlarınıza ne kolaylıkta söylersiniz? Çok kolay ☐ Oldukça kolay ☐ Çok kolay değil ☐ Oldukça zor ☐ Çok zor ☐
25	<u>Yakın</u> arkadaşlarınızın hayatındaki gündelik detaylarla ne derece ilgilisiniz? (ör. ilişkileri,aileleri, hayatlarında neler oluyor) Tamamen ilgisiz ☐ Çok ilgili değil ☐ Oldukça ilgili ☐ Çok ilgili ☐
26	<u>Sıradan</u> arkadaşlarınızın hayatındaki gündelik detaylarla ne derece ilgilisiniz? (ör. ilişkileri,aileleri, hayatlarında neler oluyor) Tamamen ilgisiz ☐ Çok ilgili değil ☐ Oldukça ilgili ☐ Çok ilgili ☐
27	Bir grup içerisinde olduğunuz zaman (ör. işte, okulda, kilisede)sizin için dedikodulardan haberdar olmak ne kadar önemlidir? (ör. kim kimi sevmez, kimin kiminle kötü bir ilişkisi oldu, sırlar) Hiç önemli değil ☐ Çok az önemli ☐ Oldukça ☐ önemli Çok önemli ☐ En üst seviyede önemli ☐
28	Arkadaşlarınız ile olan ilişkilerinizi korumaya kıyasla daha çok kariyeriniz için çalışır mısınız? Evet ☐ Hayır ☐ Eşit ☐

29.	Arkadaşlarınızla buluşmak için ne sıklıkta plan yaparsınız? Yılda 1 yada 2 kere ☐ İki – üç ayda 1 kere ☐ Ayda 1 kere ☐ Birkaç haftada 1 kere ☐ Haftada 1 yada 2 kere ☐ Haftada 3 yada 4 kere ☐ Yukarıdakilerin hepsinden fazla ☐
30.	Arkadaşlarınızla nasıl bağlantı kurmayı tercih ederdiniz? *(Lütfen: en çok tercih ettiğiniz seçeneğin yanındaki kutuya 1 yazın* *ikinci tercih ettiğiniz seçeneğin yanındaki kutuya 2 yazın* *üçüncü tercih ettiğiniz seçeneğin yanındaki kutuya 3 yazın)* Yüzyüze ☐ Eposta/Mektup ☐ Telefon görüşmesi ☐
31.	Yeni arkadaşlar edinmeyi ne kadar kolay bulursunuz? Çok kolay ☐ Oldukça kolay ☐ Çok kolay değil ☐ Oldukça zor ☐ Çok zor ☐
32.	Bir günü geçirmek için ihtiyaç duyacağınız <u>en düşük</u> sosyal iletişim miktarı ne olurdu? Sıfır sosyal iletişim–yalnızlık duymam ☐ Sadece insanların yanında olmak, onlarla konuşmuyor olsam bile ☐ Sıradan bir sohbet (ör. bir tezgahtar veya kuaför ile) ☐ Bir arkadaş ile bir sohbet ☐ Gün içerisinde arkadaşlarla bir kaç sohbet ☐ Yukarıdakilerin hepsinden fazla ☐
33.	Bir haftayı geçirmek için ihtiyaç duyacağınız en düşük sosyal iletişim miktarı ne olurdu? Sıfır sosyal iletişim–yalnızlık duymam ☐ Sadece insanların yanında olmak, onlarla konuşmuyor olsam bile ☐ Sıradan bir sohbet (ör. bir tezgahtar veya kuaför ile) ☐ Bir arkadaş ile bir sohbet ☐ Hafta içerisinde arkadaşlarla iki üç kez sohbet ☐ Hergün bir arkadaşla bir sohbet ☐ Her gün bir arkadaşla iki üç kez sohbet ☐ Yukarıdakilerin hepsinden fazla ☐
34.	Arkadaşlarınızla konuşurken aşağıdakilerin hangisine ne kadar zaman ayırıyorsunuz? (*Lütfen: En çok konuşulan konunun yanındaki kutuya 1 yazın.* *İkinci en çok konuşulan konunun yanındaki kutuya 2 yazın.* *Bu şekilde sırayla devam ederek en az konuşulan konuya da 7 yazın.* *Her bir sayıyı sadece bir kere kullanın – sayılar arasında eşitlik*

	olmamalı) Siyasal ve güncel meseleler ☐ Hobi ve ilgi alanları (ör. spor, TV, müzik, sinema,moda,tatiller,bahçıvanlık vb.) ☐ Kişisel meseleler(ör. hayatla ilgili seçimler, tartışmalar, hisler) ☐ İş ☐ Aile ve arkadaşlar ☐ Hava durumu ☐ En son görüşmenizden bu yana ne yaptıklarınız ☐
35.	Sosyal ortamlarda birisiyle ilk kez buluştuğunuzda aşağıdakilerden birisiyle ilgili konuşmanız ne kadar olasıdır? *(Lütfen: En çok konuşulacak olan konunun yanındaki kutuya 1 yazın.* *İkinci en çok konuşulacak olan konunun yanındaki kutuya 2 yazın.* *Bu şekilde sırayla devam ederek en az konuşulacak olan konuya da 7 yazın* *Her bir sayıyı sadece bir kere kullanın – sayılar arasında eşitlik olmamalı)* Siyasal ve güncel meseleler ☐ Hobi ve ilgi alanları(ör. spor, TV, müzik, sinema,moda, tatiller,bahçıvanlık vb.) ☐ Kişisel meseleler(ör. hayatla ilgili seçimler, tartışmalar, hisler) ☐ İş ☐ Aile ve arkadaşlar ☐ Hava durumu ☐ Son zamanlarda ne yapıyor olduğunuz ☐

Bu ölçeği bitirdiğiniz için teşekkür ederiz.

Appendix B: PCA Results of AQ

Items	Social-Communication Skills	Attention
AQ7. Other people frequently tell me that what I've said is impolite, even though I think it is polite.	.393	
AQ11. I find social situations easy.	.489	
AQ13. I would rather go to a library than a party.	.437	
AQ17. I enjoy social chit-chat.	.514	
AQ22. I find it hard to make new friends.	.481	
AQ26. I frequently find that I don't know how to keep a conversation going.	.573	
AQ31. I know how to tell if someone listening to me is getting bored	.543	
AQ33. When I talk on the phone, I'm not sure when it's my turn to speak.	.587	
AQ35. I am often the last to understand the point of a joke.	.565	
AQ36. I find it easy to work out what someone is thinking or feeling just by looking at their face.	.468	
AQ39. People often tell me that I keep going on and on about the same thing.	.476	
AQ44. I enjoy social occasions.	.572	
AQ45. I find it difficult to work out people's intentions.	.499	
AQ47. I enjoy meeting new people.	.633	
AQ48. I am a good diplomat.	.306	
AQ4. I frequently get so strongly absorbed in one thing that I lose sight of other things.		.474
AQ5. I often notice small sounds when others do not.		.434
AQ9. I am fascinated by dates.		.413
AQ10. In a social group, I can easily keep track of several different people's conversations.		-.421

AQ12. I tend to notice details that others do not.		.457
AQ16. I tend to have very strong interests which I get upset about if I can't pursue.		.420
AQ19. I am fascinated by numbers.		.450
AQ32. I find it easy to do more than one thing at once.		-.333
Eigenvalue	6.84	2.99
Percentage of variance explained	13.69	5.99

Appendix C: Eastern Mediterranean University Psychology Department's Ethics and Research Committee Approval Letter

Eastern Mediterranean University

The Department of Psychology
Eastern Mediterranean University
Research & Ethics Committee
Senel Husnu Raman-Chairperson

Famagusta, Turkish Republic of Northern Cyprus
Tel: +(90) 392 630 1389
Fax: +(90) 392 630 2475
e-mail: shenelhusnu.raman @emu.edu.tr
Web:http://brahms.emu.edu.tr/ psychology

Ref Code: 14/11-01

Date: 12.11.2014

Dear Nadir Kocabasoglu,

Thank you for submitting your revised application entitled *Autism Spectrum Conditions and friendship in Turkish speaking sample.* Your application has now been *approved* by the Research & Ethics Committee on 12.11.2014.

If any changes to the study described in the application or supporting documentation is necessary, you must notify the committee and may be required to make a resubmission of the application. This approval is valid for one year.

Yours sincerely,

Assoc. Prof. Dr. Senel Husnu Raman
On Behalf of the Research & Ethics Committee
Psychology Department
Eastern Mediterranean University